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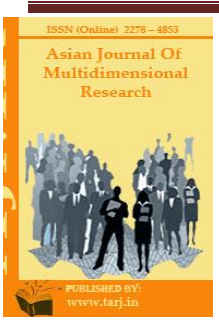

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APPLICATION OF DEEP LEARNING IN MEDICAL IMAGE ANALYSIS

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ABSTRACT

Deep learning techniques, particularly convolutional networks, have quickly risen to prominence as the preferred approach for interpreting medical pictures. This article highlights nearly 300 contributions to the area, the most of which were published during the past year, and covers the main deep learning principles relevant to medical picture analysis. We look at how deep learning may be used for picture categorization, object recognition, segmentation, registration, and other applications. Studies in the following areas are summarized briefly: neuro, retinal, pulmonary, digital pathology, breast, cardiac, abdominal, and musculoskeletal. We conclude with a review of the present state of the art, a critical evaluation of outstanding problems, and future research prospects. In an era of medical big data, the benefit of deep learning is that important hierarchical connections within the data may be found algorithmically rather than laboriously hand-crafting features. We go through the fundamentals of medical image classification, localization, detection, segmentation, and registration, as well as their applications.We wrap off by talking about research roadblocks, new patterns, and potential future paths.

KEYWORDS:*Convolutional Neural Networks, Deep Learning, Dimensional Medical Image Analysis, Machine Learning.*

1. INTRODUCTION

Researchers began developing automated analysis tools as soon as it was feasible to scan and load medical pictures onto a computer. From the 1970s through the 1990s, medical image analysis was accomplished by combining low-level pixel processing (edge and line detector filters, region expanding) with mathematical modeling (fitting lines, circles, and ellipses) to create compound rule-based systems that performed specific tasks. Expert systems include numerous if-then-else statements, which were popular in artificial intelligence around the same time period. GOFAI (good oldfashioned artificial intelligence) was a term used to characterize

expert systems that were fragile and comparable to rule-based image processing systems.Guided methods, in which training data is used to build a system, were more prominent in medical image analysis towards the end of the 1990s[1]. Active shape models, atlas techniques, and the idea of feature extraction and the usage of statistical classifiers are all examples. This pattern recognition or machine learning approach is still widely used, and many commercially available medical image analysis systems are based on it[2]. As a result, we've witnessed a transition from systems that are entirely developed by humans to systems that are taught by computers utilizing example data and extracted feature vectors. In the high-dimensional feature space, computer algorithms establish the best decision boundary. The extraction of discriminant characteristics from pictures is a critical step in the construction of such systems. This procedure is still carried out by human researchers, and as a result, systems with handmade characteristics are referred to. Allowing computers to learn the characteristics that best describe the data for the issue at hand is a natural next step. Many deep learning techniques are based on this concept: models (networks) with many layers that convert input data (e.g. pictures) into outputs (e.g. illness present/absent) while learning higher level characteristics. Convolutional neural networks have proven to be the most effective kind of image processing model to date (CNNs)[3]. CNNs have several layers that use tiny convolution filters to modify their input. CNNs have been studied since the late 1970s , and they were first used in medical image analysis .In LeNet, they saw their first successful real-world application for hand-written digit recognition. Despite these early successes, the use of CNNs did not gain traction until new techniques for efficiently training deep networks were developed, as well as advances in core computing systems. The contribution of to the ImageNet challenge in December 2012 was the turning point[3]. AlexNet, the proposed CNN, won the competition by a large margin. Using related but deeper architectures, more progress was made in subsequent years. Deep convolutional networks have supplanted other techniques in computer vision. These significant developments have been noticed by the medical image analysis community. The shift from systems that utilize handmade features to systems that learn features from data, on the other hand, has been slow. Many different techniques for learning features were popular before AlexNet's breakthrough. give a comprehensive overview of various methods. Principal component analysis, image patch clustering, dictionary approaches, and many others are among them. Only at the end of their review, in a section titled Global training of deep models, introduce CNNs that are trained end-to-end. We concentrate only on such deep models in our study, and we leave out more conventional feature learning methods that have been used on medical pictures[4].

1.1 History of medical image analysis:

The rule-based, expert systems were developed as a result of the symbolic AI paradigm of the 1970s. Shurtleff's MYCIN system, which suggested different antibiotic therapy regimens for patients, was an early implementation in medicine. Parallel to these advancements, AI algorithms transitioned from heuristic-based techniques to manual, handcrafted feature extraction techniques, and finally to supervised learning techniques. Although unsupervised machine learning methods are being investigated, the majority of the algorithms published in the literature between 2015 and 2017 used supervised learning methods, such as Convolutional Neural Networks (CNN). Apart from the availability of large labelled data sets, hardware advancements in Graphical Processing Units (GPUs) have also improved CNN performance, resulting in their widespread use in medical image analysis. The first artificial neuron was described by McCulloch and Pitts in 1943, and the perceptron was proposed by Rosenblatt in 1958. An artificial neural network (ANN) is a layer of connected perceptron's that links inputs and outputs, and deep neural networks are multiple layers of ANNs. A deep neural channel's benefit is its capacity to learn important low-level characteristics (such as lines or edges) and combine them with higher-level features (such as shapes) in future layers. This is how the visual cortices

of mammals and humans are thought to process visual information and recognize objects. CNNs may have their roots in Fukushima's Neocognitron concept from 1982, but it was who formalized CNNs and errorsbackpropagation to successfully perform the automatic recognition of handwritten digits. After won the 2012 Imagenet Large Scale Visual Recognition Challenge (ILSVRC) using a CNN that had a 15% error rate, CNNs were widely used in image recognition. The runner-up had a mistake rate of nearly twice that of the winner, at 26%. The use of Rectified Linear Unit (RELU) functions in CNNs, data augmentation, and dropout were all introduced by and are still used in CNNs today. Since then, CNNs have been the most widely used architecture in every ILSVRC competition, even surpassing human performance in image recognition in 2015. As a result, the number of research papers published on CNN design and applications has increased dramatically, making CNNs the dominating architecture in medical image processing[3].

1.1 CONVOLUTIONAL NEURAL NETWORKS

The 2-dimensional and 3-dimensional architecture of the organ being examined are both important in determining what is normal and what is pathological. CNNs are well-suited to conduct image identification tasks because they retain these local spatial connections. CNNs have been used for image classification, localization, detection, segmentation, and registration, among other things. Due to its unique feature of maintaining local picture connections while conducting dimensionality reduction, CNNs are the most common machine learning method in image identification and visual learning applications[5]. This captures key feature connections in an image (such as how pixels on an edge combine to create a line) while also reducing the amount of parameters the algorithm must calculate, resulting in increased computational efficiency. CNNs can process both 2-dimensional and 3-dimensional pictures with minimal changes as inputs. Because certain modalities, such as X-rays, are 2-dimensional, while others, such as CT or MRI scans, are 3-dimensional volumes, this is a beneficial benefit when developing a system for hospital usage. CNNs and Recurrent Neural Networks (RNNs) are supervised machine learning algorithms that need a lot of training data. Medical image analysis has also been explored using unsupervised learning methods. Autoencoders, Restricted Boltzmann Machines (RBMs), Deep Belief Networks (DBNs), and Generative Adversarial Networks (GANs) are a few examples (GANs)[6].

1.2 Used of Deep learning in medical image analysis

- CLASSIFICATION:Computer-Aided Diagnosis is another name for classification (CADx). In 1995, Lo et al. developed a CNN for detecting lung nodules on chest X-rays [45]. To determine if an area had a lung nodule, they utilized 55 chest x-rays and a CNN with two hidden layers[7]. Deep learning development in this modality is believed to have been boosted by the relative availability of chest x-ray pictures. 150,000 training samples from 1850 chest x-ray scans. They categorized the orientation of the pictures into frontal or lateral views with near-perfect accuracy using a modified pre-trained Google Net CNN. Although this job of determining the orientation of the chest x-ray is of little clinical use, it does show the efficacy of pre-training and data augmentation in learning the necessary picture metadata as part of a completely automated diagnostic work-flow. Pneumonia, often known as a chest infection, is a frequent health issue that is easily treated all around the globe.used 112,000 pictures from the ChestXray14 dataset to identify 14 distinct illnesses observed on chest x-rays using a modified Dense Net with 121 convolutional layers dubbed Chex Net. Chex Net classified the 14 illnesses with state-of-the-art accuracy; the pneumonia classification, in particular, received an Area Under Curve (AUC) score of 0.7632 using Receiver OperatingCharacteristics (ROC) analysis[3]. Chex Net also equaled or outperformed the performance of four individual radiologists, as well as a panel of three radiologists, on a test set of 420 pictures. Based on 1010 labelled CT lung images from the Lung Image Database

Consortium (LIDC-IDRI) dataset. Utilized CNNs in combination with Support Vector Machine (SVM) and Random Forest (RF) classifiers to identify lung nodules as benign or malignant[3]. They utilized three parallel CNNs, each with two convolution layers, to extract features from picture patches at various sizes. The learnt characteristics were utilized to create an output feature vector, which was subsequently categorized as benign or malignant using either an SVM with radial basis function (RBF) filter or an RF classifier[8].Their technique correctly identified nodules with an accuracy of 86%, and they discovered that it was resistant to various amounts of noise input. Three-dimensional CNNs were utilized to interpolate missing imaging data between MRI and PET images.The researchers looked at 830 individuals using MRI and PET scans from the Alzheimer Disease Neuroimaging Initiative (ADNI) database. 3-D CNNs were trained to recreate PET pictures from patients who did not have them, using MRI and PET scans as input and output, respectively[3]. Their reconstructed PET pictures almost matched ground truth illness classification findings, but one drawback is that overfitting problems were not addressed, limiting the technique's potential generalizability[5].

- LOCALIZATION: The practice clinician is less likely to be interested in normal anatomy localization, but it may have uses in anatomy teaching. Localization may also be useful in completely automated end-to-end applications, in which the radiological picture is processed and reported without the need for human involvement. Used transverse CT image slices to build a two-stage CNN, the first of which detected local patches and the second of which differentiated the local patches by various bodily organs, resulting in better results than a conventional CNN. Used a CNN with five convolution layers to classify around 4000 transverse axial CT images into one of five categories: neck, lung, liver, pelvis, and legs. After using data augmentation methods, he was able to obtain a 5.9% classification error rate and an AUC score of 0.998. Utilized stacked autoencoders to identify the locations of the liver, heart, kidney, and spleen in 78 contrast-enhanced MRI images of the abdomen area harboring liver or kidney metastatic tumors. Depending on the organ, hierarchal characteristics were learnt across the spatial and temporal domains, yielding detection accuracies of 62 percent to 79 percent[8].

- **DETECTION:** Detection, also known as Computer-Aided Detection (CADe), is an important field of research since failing to detect a lesion on a scan may have serious implications for both the patient and the physician. The challenge for the 2017 Kaggle Data Science Bowl was to identify malignant lung nodules on CT lung images. For the competition, about 2000 CT images were published, and the winner, received a logarithmic loss score of 0.399. Their method utilized a 3-D CNN based on the U-Net architecture to isolate small patches before detecting nodules[9]. The result was then input into a second stage, which consisted of two completely linked layers for cancer probability categorization. On CT images, assessed five well-known CNN designs for identifying thoracoabdominal lymph nodes and interstitial lung disease. Lymph nodes must be detected since they may be a sign of infection or malignancy. Using Google Net, they were able to obtain a mediastinallymph node identification AUC score of 0.95 and a sensitivity of 85% for mediastinal lymph node detection. They also demonstrated the advantages of transfer learning and the usage of deep learning architectures with up to 22 layers, as compared to the fewer layers used in medical picture analysis before.Overeat was a CNN that won the ILSVRC 2013 localization challenge after being pre-trained on natural pictures. Used Overfeat to predict the presence of nodules inside and around lung fissures using 2-dimensional slices of CT lung images orientated in the coronal, axial, and sagittal planes. They coupled this method with basic SVM and RF binary classifiers, as well as a Bag of Frequencies , an original 3-dimensional descriptor[1].

- **SEGMENTATION:** The study on CT and MRI mage segmentation includes a wide range of organs, including the liver, prostate, and knee cartilage, but there has been a lot of emphasis on brain segmentation, particularly tumor segmentation. The latter is particularly essential in surgical planning because it allows surgeons to pinpoint the precise borders of the tumor and therefore guide surgical excision. Neurological impairments such as limb weakness, numbness, and cognitive impairment would result if too much of the eloquent brain regions were sacrificed during surgery. Medical anatomical segmentation has traditionally been done by hand, with a clinician sketching contours slice by slice across a full MRI or CT volume stack. It is thus desirable to develop a system that automates this time-consuming process. Who examined different CNN architectures and metrics used in segmentation, wrote an outstanding overview on brain MRI segmentation.He also discussed a number of contests and datasets, including Brain Tumor Segmentation (BRATS), Mild Traumatic Brain Injury Outcome Prediction (MTOP), and Ischemic Stroke Lesion Segmentation (ISLES)[10].

- **REGISTRATION:** Although there are many potential uses for medical image registration,, their actual clinical usage is limited. In neurosurgery or spinal surgery, image registration is used to locate a tumor or a bony landmark on the spine in order to assist surgical tumor removal or spinal screw implant implantation. To align the pictures, which may be 2 or 3-dimensional, a reference image is aligned to a second image, termed a sense image, using different similarity metrics and reference points. The reference picture might be a pre-operative MRI brain scan, whereas the sense image could be an intraoperative MRI brain scan performed after a first-pass resection to see whether there is any remaining tumor and if further resection is needed. Layered convolution layers in an encoder-decoder manner using MRI brain images from the OASIS dataset to anticipate how an input pixel would morph into its final form. They used a large deformation diffeomorphic metric mapping (LDDMM) registration model, which resulted in significant reductions in computing time.

2. DISCUSSION

Deep learning is the most advanced machine learning technique. Deep learning's success in a variety of pattern recognition applications has sparked enthusiasm and raised hopes that deep learning, also known as artificial intelligence (AI), would revolutionize health care. In certain applications, early investigations of deep learning applied to lesion identification or classification found that it performed better than traditional methods or even better than radiologists. The possibility of using deep-learning-based medical image analysis to improve the accuracy and efficiency of different diagnostic and treatment procedures has sparked fresh research and development initiatives in CAD. Despite the excitement around this new age of machine learning, there are many obstacles to developing and using CAD or AI technologies in clinical practice. We will address some of these problems in this chapter, as well as the efforts required to build strong deep-learning-based CAD tools and incorporate them into clinical workflows, thus progressing toward the objective of offering dependable intelligent assistance for patient care.

3. CONCLUSION

New areas of research include content-based image retrieval, picture report or caption creation, and physical object manipulation using LSTMs and reinforcement learning including surgical robots is all new fields of study.Below are a few cutting-edge applications that cut beyond conventional medical image analysis categories. Presented an intriguing application in which GANs were utilized to create CT brain pictures from MRI scans. This is significant because it implies patients may be able to avoid receiving ionizing radiation from a CT scanner entirely, reducing costs and increasing patient safety. Nie also took use of GANs' capacity to create better, higher-resolution pictures from native photos, reducing the blurriness in CT scans. Applying

resolution enhancement methods to produce higher-quality MRI pictures might be a beneficial advance. High-tesla (and therefore more expensive) MRI scanners are required for high-quality MRI pictures. As a result, using an algorithm to produce high-quality MRI pictures on a lower-field-strength scanner will save healthcare expenses. Chang presented a new application in the fledgling field of radio-genomics, in which radiological pictures are used to infer the tissue's underlying genetic origin. He initially learned latent characteristics from MRI scans of glioblastomamultiforme (GBM), a malignant brain tumor, using the The Cancer Genome Atlas GlioblastomaMultiforme (TCGA-GBM) data collection using an autoencoder.The learnt characteristics were then used to categorize an MRI scan into one of four known molecular sub-types of GBM using a fully connected classifier layer. Chang's study, although still preliminary, has the potential to identify a GBM sub-type and eliminate the requirement for surgical sample and genetic tests. The technique's applicability to malignancies in other parts of the body is also intriguing.

Utilized histological pictures to identify lung cancer subtypes and forecast frequent genetic alterations in a similar way. Knowing your genetic alterations may help you predict how long you'll live and which treatment to use. Their approach beats a human pathologist, with AUC values ranging from 0.73 to 0.86 for genetic mutation prediction.Presented a groundbreaking study that combined content-based image retrieval (CBIR) with computer-assisted diagnosis (CADx). In other words, their model segmented a lesion on a query picture and compared it to segmented lesions in their database, which included 400 Regions of Interest generated from the Digital Database for Screening Mammography (DDSM). The Euclidean distances between the representation vectors of the query lesion and database lesions served as the foundation for comparison. The program then generates reference pictures as well as a probability of a lesion being benign or malignant.The shortage of data in medical image analysis is two-fold and more acute: there is a general paucity of publically accessible data, and high-quality labelled data is even scarcer. The majority of the datasets in this study include less than 100 patients. Despite the limited training datasets, the articles in this study indicate rather acceptable performance in the different tasks, suggesting that the situation may not be as bad as it seems. Provided a partial solution to the issue of how many pictures are required for medical image analysis training. He tested the precision of a CNN with Google Net architecture in categorizing individual axial CT scans into one of six bodily regions: the brain, neck, shoulder, chest, belly, and pelvis. On a test set of 6000 pictures, accuracies of 88-98 percent were achieved using 200 training images. While classification into different bodily areas isn't a practical medical image analysis job, his work suggests that the issue might be solved. It's possible that the ability to classify a limited dataset is due to inherent picture homogeneity among patients, as opposed to the near-infinite diversity of nature images, such as dogs of varied breeds, colors, and postures.

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AN OVERVIEW ON TYPES OF ELECTRICAL WIRE AND ITS USES

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ABSTRACT

Color, label data, and applications are only a few of the factors that will impact our choice of electrical wire. The information written on the wire shell is all you need to choose the appropriate wire for your house. Frequently, the same term (wire or cable) is used to identify the same object, despite the fact that they are fundamentally different. A wire is a single electrical conductor, whereas a cable is a collection of wires encased in sheathing. The word cable came to mean a nautical line of several ropes used to anchor ships, as well as an electrical context in which cables (similar to wires) are used to transfer electrical currents. Multiple insulated conductors in an overall jacket, with helical tape steel or aluminum armor, or else steel wire armor, as well as a worldwide PVC or lead jacket to protect against moisture and physical damage, may be used in cables for manufacturing, commercial, and apartment buildings. Weaved bronze wires may safeguard cables designed for extremely flexible usage or in maritime applications. Under the usual construction code, electricity or power supply cables (such as computer networking) that are run in or through air-handling areas (plenums) of office buildings must either be covered in metal conduit or assessed to minimal flame and smoke production.

KEYWORDS:*Nautical, Power, Spaces, Plenums, Armour, Ships, Network, Flex.*

1. INTRODUCTION

In a building, electrical wiring refers to the cabling and connected devices such as switches, distribution boards, plugs, and lighting. To help with installation, wiring is subject to safety regulations. Allowable wire and cable types and diameters are determined by the circuit operating voltage and electric current capacity, as well as environmental factors such as ambient temperature range, moisture levels, and sunshine and chemical exposure. Voltage, current, and functional specifications apply to associated circuit protection, control, and distribution devices in a building's wire system. Local, state, and regional wiring protection

codes differ. The International Electro-technical Commission (IEC) is struggling to harmonise wiring standards between member countries, while significant differences in design and installation necessities still exist. An electrical cable is a collection of one or more wires that are bundled together or run side by side to transmit electric current[1], [2].

A cable rally is made up of one or more electrical cables and the connectors that go with them. A cable rally is not always appropriate for connecting two devices, but it may be used as a supplement (e.g. to be soldered onto a printed circuit board with a connector mounted to the building). Cable assemblies may also use a cable tree or cable harness system ", which is used to link many terminals together.

1.1. Electrical Wire Types:

Electrical cables are divided into five categories i.e., triplex, main feeder, panel feed, non-metallic sheathed electrical wires, single strand electrical wires as shown in Figure 1:

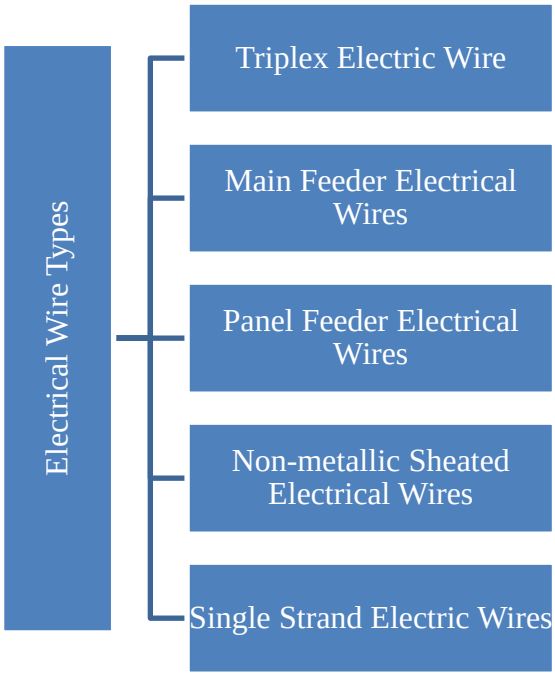

Figure 1: Illustrates the types of electrical wire used for wiring of electric circuit.

1.1.1. Triplex Electrical Wires:

Outside of weather heads, triplex electrical wires are frequently used in single-phase service drop cables. They are made up of two insulated aluminum wires that are wrapped around a third bare wire that serves as a public neutral. In addition to being grounded at both the electric meter and the transformer, the neutral is usually of a smaller gauge[3], [4].

1.1.2. Main Feeder Electrical Wires:

The wires that connect the service weather head to the home are known as central power feeder wires. They're constructed of stranded or solid THHN wire, with the cable placed 30 percent longer than the load required.

1.1.3. Electrical Wires for Panel Feeds:

Panel feed cables are typically black insulated THHN wire. These are used to power the circuit breaker panels and the core junction container. The cables must be rated to 50 percent higher than the actual load, much as core power feeder electrical lines.

1.1.4. Non-Metallic Sheathed Electrical Wires:

Romex, or non-metallic sheathed electrical wire, is used in most buildings and has two to three conductors, each with plastic insulation and a bare crushed wire. The separated wires are further shielded by a layer of non-metallic sheathing. This kind is popular in-house wiring since it is somewhat cheaper and comes in a variety of ratings (10 to 20 amps).

1.1.5. Single Strand Electrical Wires:

Single strand wire is used in a variety of applications, including THHN wire. Every wire is distinct, and several wires may undoubtedly be brought together via a conduit. Single-strand electrical wires are the most popular option for wire-in-pipe configurations.

2. CLASSIFICATION OF ELECTRICAL-CABLES

There are presently ten distinct types of cables available, with uses ranging from transmission to heavy industrial. The following are a few of the more often used ones:

2.1. Sheathed-Cable (Non-Metallic):

Non-metallic building wire, or NM wires, is another name for these cables. Apart from a bare wire to grounding, they have a flexible plastic jacket with two to four wires (TECK cables are roofed with thermoplastic insulation). Special variants of this cable are used for subterranean or outdoor applications, whereas non-metallic encased cables such as the NM-B and NM-C are the most prevalent kind of interior residential cabling[5].

2.2. Feeder-Cable (Underground):

These cables are similar to NM cables, except that instead of each electrical wire being separately wrapped in thermoplastic, the wires are gathered and incorporated in the flexible material. UF cables come in a variety of gauge diameters and are often used for outdoor lighting and in-pounded applications. Their great water resistance makes them suitable for wet locations such as gardens, as well as open-air lights, pumps, and other similar applications[6].

2.3. Metallic Sheathed Cable:

Metal-sheathed cables, also known as armored or BX cables, are often used to deliver mains power or heavy equipment. Three simple stranded copper wires (one for current, one for grounding, and one for neutral) are insulated with cross-linked polyethylene, PVC bedding, and black PVC wrapping. Outdoor applications and high-stress installations often utilize BX cables with steel wire sheathing.

2.4. Cable with Multiple Conductors:

Because it is easy to use and well-insulated, this is a cable type that is frequently used in houses. Multi-conductor or multi-core (MC) cables have several conductors, each of which is separately insulated. In addition, an exterior insulating layer has been added for additional security. In industries, several types are utilized, such as the audio multicore ‘snake cable' used in the music business.

2.5. Coaxial Cable (F):

A tubular insulating coating protects an inner conductor that is further bordered by a tubular conducting shield and a coaxial (sometimes helix) cable may also have an outer sheath for

additional insulation. These cables are often used to transport television signals with connecting video equipment and are referred to as "coaxial" because the two inner shields share the same geometric axis.

2.6. Twisted Pair Cable (Unshielded):

This kind is made up of two wires that have been twisted together, as the name implies. This cable is ideal for signal transmission and video applications since the individual wires are not shielded. UTP cables are often used in telephones, security cameras, and data networks because they are less expensive than coaxial or optical fiber connections. Because UTP cables with copper wires or solid copper cores are flexible and can be readily bent for in-wall installation, they are a popular option for interior usage[7].

2.7. Ribbon Cable (H):

Ribbon cables, which include different conducting wires that run parallel to one other on a flat surface and resemble flat ribbons, are often used in computers and peripherals. These cables are very adaptable and can only be used for low-voltage applications.

2.8. Underground Cable:

These cables, also known as DBCs, are specially-designed coaxial or bundled fiber-optic cables that do not need any additional sheathing, insulation, or piping before being buried below. A strong metal core with several layers of banded metal sheathing, thick rubber shells, shock-absorbing gel, and waterproof wrapped thread-fortified tape are among the features. They are a common option for transmission or communication needs because to their high resistance to temperature fluctuations, moisture, and other environmental factors[8]. Figure 2 shows the construction of electric cable.

1. Twin (Lead-Cable): Similar to TV blues radio, they are flat two-wire cables used for transmission between an antenna and receiver.

2. Twin-axial Cable: This is a kind of coaxial cable that has two inner conductors instead of one and is used to transmit high-speed communications across small distances.

3. Paired Cable (L): That cable is usually used in (DC or low-frequency AC)-uses and applications due to its two independently insulated conductors.

4. Twisted Pair (M.): The inner insulated wires of this cable are twisted or interwoven, similar to paired cables.

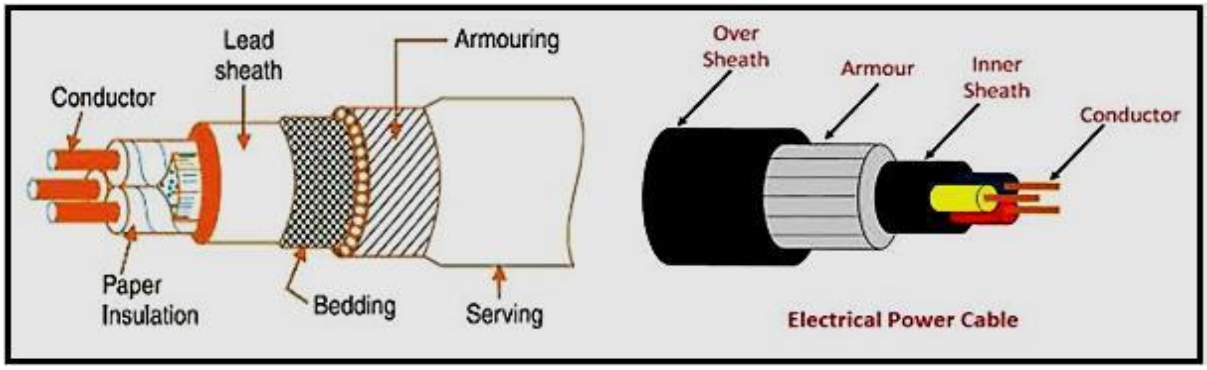

Figure 2: Illustrates the construction of underground electrical cables[9]**.**

More regular wiring fluctuations can be calculated in a light lucrative environment, big tools may be fixed, and specific temperature or moisture conditions can apply. Heavy industries

have more stringent wiring requirements, such as extremely high currents in addition to higher voltages, frequent equipment layout changes, corrosive, damp, or explosive environments. Special restrictions may apply to the installation of electrical equipment in hazardous locations in facilities that handle flammable gases or liquids.There are presently ten distinct types of cables available, with uses ranging from transmission to heavy industrial. The following are a few of the more often used ones:

3. MODERN WIRING MATERIALS:

Two to four wires coated with thermoplastic insulation, plus a bare wire for grounding (bonding), are bordered by a flexible plastic jacket in modern non-metallic sheathed cables, such as types NMB and NMC (US and Canadian). Before the plastic jacket is placed, some versions wrap the individual conductors in paper. Special variants of non-metallic encased cables, such as US Type UF, are intended for direct underground burial (sometimes with a separate mechanical barrier) or outdoor usage when UV exposure is a concern. These cables are distinguished by their moisture-resistant structure, the absence of paper or other absorbent fillers, and their UV resistance formulation. Because of its excellent moisture resistance, rubber-like synthetic polymer insulation is utilized in industrial and electrical cables placed underground. Insulated cables are rated based on their maximum working temperature and allowed operating voltage at the conductor surface. A cable may have several use ratings for different purposes, such as one for dry installations and another for moisture or oil exposure.

Because the wiring does not need to be particularly flexible, single conductor construction wire in tiny diameters is usually solid wire. The circuit voltage, heat rating, and environmental circumstances (moisture, sunshine, oil, and chemicals) under which they may be used are all used to grade building wire. A voltage (to neutral) rating and a maximum conductor surface temperature rating are both assigned to a wire or cable. The quantity of current a cable or wire may safely carry is determined by the circumstances of installation. Conductors bigger than 10 AWG (or approximately 6 mm2) are stranded for installation flexibility, but they aren't flexible enough to be used as an appliance cable. Cables for industrial, commercial, and residential structures are available "involve a large number of insulated conductors in an overall jacket, with helical tape steel or aluminum armor, or steel wire armor, and perhaps a PVC or lead jacket for moisture and physical damage protection. Weaved bronze wires may protect cables designed for extremely flexible usage or in maritime applications. Under the model building code, power or communications cables (such as computer networking) that are run in or through air-handling areas (plenums) of office buildings must be enclosed in metal conduit or certified for minimal flame and smoke generation. Electrical cables link two or more devices, allowing electrical signals or power to be sent from one to the other. Cables are used for a variety of reasons, and each one requires customization. In electronic equipment, cables are often used for power and signal circuits. Undersea cables are used for long-distance communication. Electricity cables, particularly high-voltage wire, are used for bulk transfer of alternating and direct current power. Electrical cables are widely utilized in the wiring of buildings for lighting, power, and control circuits that are permanently fixed. When compared to alternative wiring techniques, installation labor is reduced since all of the circuit conductors needed may be placed in a cable at the same time.

3.1. Sizes of Stranded Wire AWG:

AWG gauges are used in the same way "Wire with strands is referred to as stranded wire. It refers to a wire with a cross-sectional area equal to the sum of the cross-sectional areas of all the individual strands; gaps between strands are not included. These gaps comprise approximately 10% of the wire area when constructed with circular strands, necessitating a wire that is about 5% thicker than comparable solid wire. The overall AWG size, the number

of strands, and the AWG size of a strand are all used to specify stranded wires. A slash separates the strand number and the AWG of each strand. For example, a 22 AWG 7/30 stranded wire is a 22 AWG wire made" from seven strands of 30 AWG wire, figure 3.

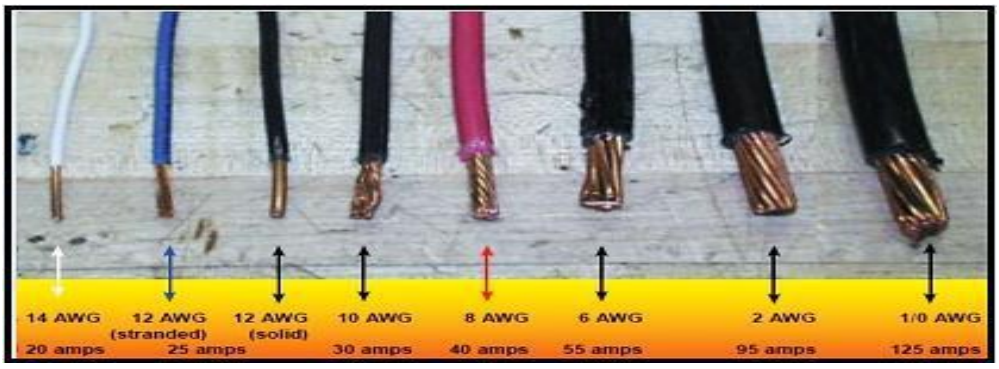

Figure 3: Represents stranded wires of different sizes used for wiring of circuit[10]**.**

4. DISCUSSION

An electrical cable is a physical assembly made up of one or more conductors, each having their own insulation and optional screens, as well as separate coverings, assembly protection, and protective covering. Wires may be stranded to make electrical cables more flexible. Smaller individual wires are twisted or braided together in this technique to create bigger, more flexible wires than solid wires of equal size. The greatest flexibility is gained by bundling tiny wires before concentric stranding. Copper wires in a cable may be bare or plated with a thin coating of another metal, most often tin, but also gold, silver, or other metals. Tin, gold, and silver are less prone to oxidation than copper, which may help extend the life of wires and make soldering simpler. Tinning is also utilized to keep the strands lubricated. Rubber insulation was removed with the aid of tinning. The cable is extendable (CBA – as in telephone handset cords) because of tight lays during stranding. Trunking, cable trays, cable ties, and cable lacing are all options for securely fastening and organizing cables. Strain relief devices or cable ties may be used to secure continuous-flex or flexible cables used in moving applications inside cable carriers. Current tends to flow along at high frequencies "the conductor's outer surface the skin effect is the term for this.

These effects are frequently undesirable, resulting in unwanted energy transmission that may negatively affect nearby equipment or other parts of the same piece of equipment, as well as unwanted noise pickup that may mask the desired signal being carried via the cable, or, if the cable is carrying power supply or control voltages, pollute them to the same extent. Because pick-up and transmission are basically related to cable length, the initial answer to these issues is to keep cable lengths in buildings low. The second option is to direct wires away from potential problems. There are also certain cable designs that reduce electromagnetic pickup and transmission. Shielding, coaxial geometry, and twisted-pair geometry are three of the most important design systems.

The electrical concept of the Faraday cage is used in shielding. The cable is completely wrapped in foil or wire mesh over its whole length. All cables going through this shielding layer will be isolated from external electrical fields to a considerable degree, especially if the shield is linked to a constant voltage source like earth or ground. Low-frequency magnetic fields, such as magnetic "hum" from a nearby power transformer, are not well protected by simple shielding of this kind. On cables with a voltage of 2.5 kV or higher, a beached shield collects leakage current and capacitive current, protecting people from electric shock and balancing load on the cable insulation.

The use of a coaxial design aids in "Along with pickup, further decrease low-frequency magnetic transmission. The foil or mesh shield has a circular cross section in this configuration, and the inner conductor is located precisely in the middle. This causes the voltages involved to be split into two almost equal magnitudes that cancel each other out through a magnetic field between the shield and the core conductor. Two wires of a cable are twisted around each other to form a twisted pair. Put one end of a pair of wires in a hand drill and spin while keeping modest strain on the line to illustrate this.When the wavelength of the interfering signal is longer than the pitch of the twisted pair, opposite lengths of wire produce opposing voltages, which tends to negate the impact "because of the interfering.

5. CONCLUSION

Wherever cables enter electrical equipment, they are usually protected with specific fittings; this may be a simple screw clamp to keep jacketed cables dry, or a polymer-gasketed cable connector that automatically engages the amour of an armored cable and provides a water-resistant connection. Where the cable runs through locations where flammable gases are present, special cable fittings may be used to prevent explosive gases from flowing through the inside of jacketed cables. Cables must be maintained at their entry to devices and at regular intervals throughout their runs to prevent loosening of the companions of individual conductors. To provide conductors for vertical cable lines in big structures, unique designs are required. Unless the fitting is rated or described for several cables, just one cable is usually allowed per fitting. They must also withstand salt water or salt spray corrosion, which is achieved by using thicker, specifically designed jackets and tinning the individual wire supports.

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DESIGN AND FABRICATION OF AQUA SILENCER: A REVIEW

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ABSTRACT

In order to reduce emission and noise in vehicle exhaust, an Aqua Silencer is used. It's made of activated carbon, a perforated tube, and an outer shell. In other words, an Aqua Silencer is a modified form of a standard silencer designed to reduce harmful emissions from an IC engine's exhaust into the atmosphere as well as to reduce noise generated by dampening techniques that include water, thus the name. Pollution continues to rise on a daily basis. Exhaust from cars and industry is the most significant cause of pollution. As a result, a replacement technology known as Aqua silencer has been developed to reduce harmful pollutants from engine exhaust. An Aqua silencer is a device designed to filter pollutants such as CO, UBHC, NOx, and Lead generated by vehicles. It works using a charcoal layer, a perforated tube, and water. Due to the presence of water, noise levels are also decreased when compared to an open area. As a result, it is given the name AQUA SILENCER.

KEYWORDS:*Aqua Silencer, Charcoal, Emission Control, Noise, Water, Pollutants.*

INTRODUCTION

Almost usually realize that perhaps the automobile sector contributes significantly to pollution, therefore we use Aqua Silencer to reduce both air and sound pollution. Carbon monoxide, laughing gas, sulfur dioxide, and unburned hydrocarbons are among the exhaust gases produced by engines (UBHC). These poisonous fumes are very hazardous to both the environment and human health. With the use of activated carbon and lime water, Aqua Silencer is used to decrease pollutants and noise while also reducing their negative effects.

An Aqua Silencer is a device that regulates the discharge and turbulence in automobile exhaust. It is constructed using activated charcoal, a perforated cylinder, and an exterior casing. The motor's fumes line has a water silencer installed. The nitrous and sulfur compounds produced by the engine are channeled via the activated charcoal. When sound is delivered submerged, it is less audible than when it is delivered in the air. This is due to the presence of small sprockets in water particles, which reduces its sufficiency and, as a result, reduces the sound intensity. Because of this characteristic, water is used in this silencer, giving it the name Water SILENCER. It was tested in a single chamber 4-stroke diesel engine, and the noise and smoke

levels were much higher than with a standard silencer. In ic motors, a water silencer is utilized to limit the noise and discharge. The reason for choosing a water silencer is because, in today's world, air pollution has real-world consequences for humans and the environment (Figure 1).

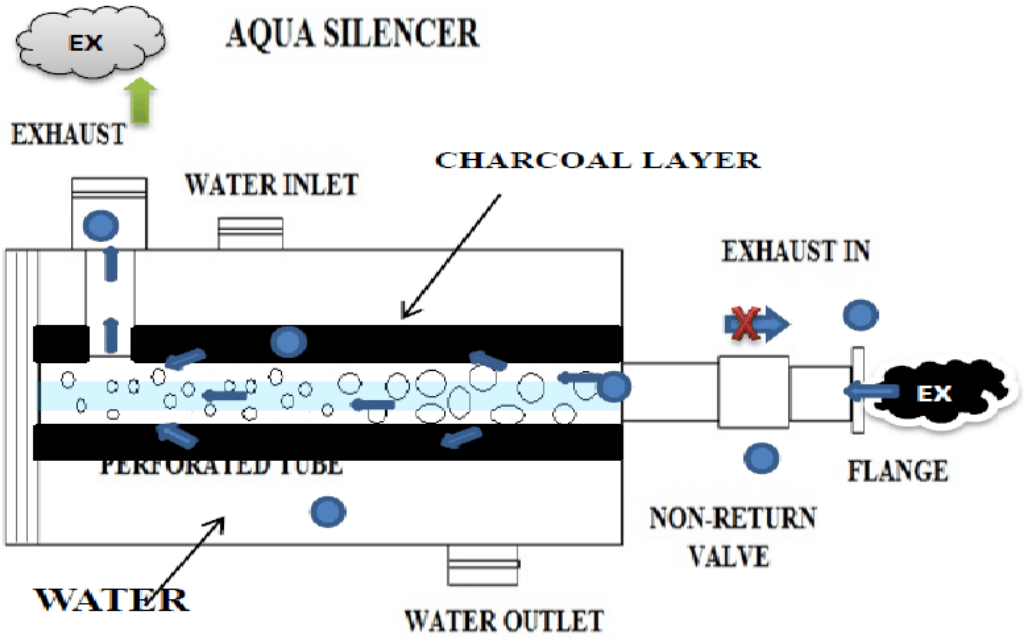

Figure 1: Illustrates the diagram shows an Aqua silencer

The primary source of air pollution is automobiles that release gases such as carbon dioxide, unburned hydrocarbons, and so on. In order to keep a strategic distance from these gases, we offer this water silencer, which is attached to the motor's fumes line. When sound is provided underwater, it is less audible than when it is given in the air. This is mostly due to little sprockets in water particles, which reduces its abundance and, as a result, reduces the sound intensity. The emanation may be limited by using the activated charcoal layer, which is very porous and forces more free valences, resulting in a high ingestion limit. As a result, consume the gases produced by the engine and contribute much less to the environment. The noise and smoke levels are much higher than with a conventional silencer, and there is no requirement for an exhaust system. It is also easy to install.

Modification of the Aqua Silencer

- Filler plug
- A coating of charcoal
- Tube with perforations
- Mesh built of wire
- Remove the drain plug
- Cylinder with a bypass
- The primary cylinder

Automobiles, which emit gases such as CO2, unburned hydrocarbons, and other pollutants, are the primary source of pollution. We shall employ an aqua silencer to reduce the emissions of those gases. It's attached to the engine's exhaust pipe. Underwater sound is less perceptible than sound generated in the atmosphere. This is due to the existence of tiny sprockets in water

molecules, which reduce the amplitude of the sound and hence the volume. Activated carbon layers and lime water are often used to reduce emissions. Because activated carbon is extremely porous and has additional free valences, it has a high absorption capacity and lime water chemically interacts with engine exhaust gases, releasing considerably fewer harmful gases into the environment. The conventional silencer reduces noise and smoke levels significantly; it does not need a converter and is simple to install.

Through a perforated tube, exhaust gas from the engine cylinder enters the twin filter silencer. Gas reaches the first filter of the silencer via the perforated tube. Perforated tube is a kind of tube with various diameter sections. As a result, high-mass bubbles are converted to low-mass bubbles via the perforated tube. Lime water interacts with harmful gases in the main filter, lowering their concentration. The gases are then sent through a secondary filter containing charcoal, which purifies the gases once more. Charcoal is very porous and has a lot of free valances. As a result, it has a high adsorption capacity. Because the sound generated in an aqua silencer beneath water has a lower amplitude than sound produced in the open environment, it lowers emission noise.

This occurs because tiny sprockets exist in water molecules, lowering the amplitude of emission gases and lowering the sound intensity. The most important component of the Aqua silencer is the perforated tube, which is made up of a number of holes of different diameters. On a perforated tube, there are usually four sets of holes. The activated charcoal layer that is pasted over perforated tubes may limit the emission utilizing extremely porous additional free is growing on our planet due to a significant rise in pollution. On our planet, pollution is a major problem. As a result, different significant efforts are needed to solve these issues. As a result, a replacement technology known as Aqua silencer has been developed to reduce harmful pollutants from engine exhaust. Because sound is common, these layers have a high absorption capacity. In an IC engine, it regulates noise and emissions[1]. It's attached to the pipe's exhaust; sound generated beneath water is less audible than sound produced in the air. The activated carbon layer and lime water are often used to reduce gas emissions. The conventional silencer reduces noise and smoke levels significantly; it does not need a converter and is simple to install. This silencer uses both charcoal and water, therefore it's known as a hybrid aqua silencer. It's useful in automobiles, industry, DG sets and DG machines, Marin and Boats, and it's also known as a hybrid universal aqua silencer. The Aqua Silencer is simple to install and does not need a converter. One of the most significant ways for effectively reducing harmful gases and noise is the use of an aqua silencer.

Ultimately, the combustion products escape into the atmosphere via the aperture. The dual filter silencer is more straightforward in terms of reducing emissions from engine exhaust gases utilizing a water and lime stone combination. The sound level is decreased by employing a water and lime stone combination since the back pressure remains constant. Sound is frequently reduced by utilizing water as a medium, and we may regulate exhaust emissions to a larger extent by employing limestone in water[2]. Because the amount of acidity level in twin filter silencer is anticipated to be below the harmful acidity, the water pollution is determined to be minimal. It emits no smoke or pollutants and has a low carbon footprint. As a result, the dual filter silencer lowers noise as well as pollutants. The performance of the dual filter silencer is almost identical to that of the conventional silencer. With its thin construction and light weight, the water silencer framework is intended to replace commonly used single unit silencers in motors. It has a major role in the commotion and gas outflow from engines. Air pollution has a dangerous effect on the human body, animals, and the environment. The main reason for using a water silencer is that air pollution is quickly increasing these days. The hazardous fumes vapor from the car are reduced by this framework[3].

The started charcoal layer surrounding the perforated cylinder and lime water restricted these outflows. The capacity of the charcoal layer to absorb emanation gases from the engine is great. These types of charcoal layers with lime water react artificially to outflow gases and alter the emanation gas compound design. The exhaust gases exit through the aperture into the atmosphere, and the smoke or emanation gases and clamor level in a water silencer differs significantly from that of commonly used silencers. The dual filter silencer is more straightforward in terms of reducing emissions from engine exhaust gases utilizing a water and lime stone combination. The sound level is decreased by employing a water and lime stone combination since the back pressure remains constant[4].

The most important component of the Aqua silencer is the perforated tube, which is made up of a number of holes of different diameters. On a perforated tube, there are usually four sets of holes. The activated charcoal layer that is pasted over perforated tubes may limit the emission utilizing extremely porous additional free is growing on our planet due to a significant rise in pollution.

LITERATURE REVIEW

The study of aqua silencer modification and development is uncommon. However, just a few academics have researched on silencer noise and opacity reduction. RaimoKabral et al. described a newly designed silencer that uses a micro-perforated (MPP) tube supported by a locally responding cavity. The combined impedance of the micro-perforate and cavity is selected to meet the theoretical optimum, known as the Cremer impedance, in the frequency range of interest at the mid-frequency. It is simple to make a small silencer with substantial damping (say > 30 dB) at a range wider than an octave due to the high damping obtained at the Cremer optimum (hundreds of dB/m). Based on a light-duty vehicle application, both simulations and experimental testing of the new silencer are given[5].

P. Krause et al. are working on a semi-active muffler that adjusts the internal geometry of the muffler system or muffler in response to changes in engine conditions while driving. An active system that adds anti-noise or regulates the pulsing exhaust gas flow to smooth the gas pressure pulsation and achieve sound reduction in this manner. Different measurement findings reveal the capabilities and limitations of each system[6].

S. Martin et al. created a sound attenuation muffler. A passive muffler is classified as either a reactive or a dissipative muffler, depending on which of two noise-reduction methods it employs. A reactive muffler uses area discontinuities, branches (like a resonator), and flow reversals to reflect sound back to the engine compartment. For low to intermediate frequency ranges, this design offers excellent sound attenuation[7].

Srinivas has studied the extreme plastic deformation phenomena in silencer at el. In recent years, many severe plastic deformation (SPD) methods for creating ultra-fine grained materials in bulk metals and alloys have developed. The majority of the SPD techniques proposed are designed to process bulk materials; only a few methods, such as Equal-channel angular pressing (ECAP), High pressure torsion (HPT) technique, constrained groove pressing (CGP), and repetitive corrugation and straightening (RCS), can process sheet materials. During the ECAP process, an issue with less intersection filling and a moveable bottom wall arises. The solution to this issue is to maintain back pressure, which increases die filling and makes strain distribution more uniform[8].

Renato Barbieri et al. presented a technique for muffler shape design that combines finite element analysis with Zoutendijk's feasible directions method. Their goal was to determine the size of the acoustic muffler while maximizing the transmission loss (TL) in the frequency range of interest. For TL assessments, the enhanced four parameters technique is utilized, and the Helmholtz equation is numerically solved using the finite element method (FEM)[9].

The nonlinear free vibration response of shear deformable laminated composite and sandwich plates was studied by Manoj Kumar et al. For the study of the issues, the authors utilized a meshless method based on the multi quadric radial basis function (MQRBF). Particle mixing, bubble formation, slug development, and other factors influence heat and mass transport processes directly in fluidized bed hydrodynamics, according to Apurv Kumar. The quantity of air supply is substantially decreased under vacuum circumstances, resulting in fluidization properties that are comparable to those seen under atmospheric conditions, according to the author[10].

DISCUSSION

Gases emitted by vehicles, such as carbon dioxide and unburned hydrocarbons, are the primary source of air pollution. In order to address this significant contributor, the study focuses on modifying traditional silencers by proposing a modified Aqua silencer that reduces pollutant production. The Aqua silencer is installed similarly to a normal silencer, with minimal changes to the engine's exhaust pipe. The activated charcoal layers in the modified aqua silencer regulate emission. The silencer effectively absorbs hazardous gases from the atmosphere, making the vehicle environmentally friendly. Aqua silencer also tackles the issue of noise pollution, since sound generated in water is less perceptible because to tiny sprockets in water molecules that reduce the amplitude and hence the sound intensity. However, before the automotive industry uses aqua silencer, a few obstacles and difficulties mentioned in this paper must be properly solved.

CONCLUSION

The aqua silencer uses a perforated tubing, lime water, and charcoal to reduce the emission gases out from engine exhaust. The sound level is decreased by utilizing perforated tube since the back pressure remains constant. By utilizing a perforated tube, the fuel consumption stays the same as in a traditional system. By using water as a medium, the sound may be reduced, and we can regulate the exhaust emission to a larger extent by using activated carbon in water. Because water is used as a medium, sound is reduced, resulting in pollution-free emissions and smoke-free systems. These systems are very low-cost. Both four-wheelers and two-wheelers are equipped with this equipment. It is crucial in many sectors. It efficiently removes impurities within exhaust gases and lowers noise by utilizing activated carbon and perforated tube, while maintaining constant back pressure and using the same amount of fuel as a traditional silencer. It is a non-polluting, smokeless emission. Experiments have shown that the aqua silencer is efficient in decreasing gas emissions from engine exhaust. The use of water as a medium reduces sound levels, and the use of activated carbon in water provides virtually pollution-free and smokeless emissions, as well as being cost-effective in the long run. The performance of the aqua silencer is almost identical to that of the conventional silencer. It's often found in industrial engines and, with a little creativity, in heavy-duty automobiles. The smoke content of the exhaust gas was tested before and after treatment, and it was discovered that there was a significant decrease in emissions, as shown by the test findings.

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3D PRINTING FOR CUSTOMIZED FOOD FABRICATION

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ABSTRACT

The very first generations foods printing concept ideas and working models are presented in this research, with the goal of revolutionizing personalized food production via 3D printing (3DP). Unlike mechatronics food manufacturing techniques that aim to automated manual procedures for mass production, 3D food printing combines 3D printing with electronic cooking to create food items that can be customized in form, color, taste, texture, or even nutrition. This expands customisation possibilities to the industrial cooking industry while also introducing creative skills to fine dining. On the basis of fabrication platforms and printing materials, the chosen samples are evaluated. For single or multiple application, a comprehensive description of various 3DP technologies and their associated dispensing/printing method for 3D personalized food manufacturing is presented. Food printing's effects on customized health, on-demand food manufacturing, food manufacturing technology, and process design are ultimately discussed. Their use in home cooking and catering may offer not only an engineering approach for customized meal design and nutritional management, but also a possible tool to reconstitute a customised food system.

KEYWORDS: *Customized Food Fabrication, Food Manufacturing, 3D Printing, And PlatformDesign.*

INTRODUCTION

Customized food items are in high demand, as well as the majority of them are presently developed and produced by highly educated craftsmen. The price is quite expensive for such a little number of components. One of the possible solutions to overcome this gap is three-dimensional (3D) food printing, also known as Food Layered Manufacture. Its goal is to stack create 3D custom-designed food items without the need for entity equipment, moulding, or human involvement. As a result, this technique may improve the production efficiencies and reduced production costs for the creation of personalized food items. Eating is one of our most essential activities, and a robot chef able to follow instructions will have a wide range of uses in both domestic and industrial settings. Making cookies robots, for instance, can find ingredients, combine them in the proper sequence, and put the resultant batter in an ovens baking pan. These robots, which are outfitted with library, can execute fundamental manipulating activities such as

picking up, putting down, and pouring these microelectronics methods are often employed in conventional food industry for huge quantity to replace manual operations. They can significantly decrease workload, labor costs, and food productivity improvement. Food producers are ecstatic about such advancements, but they are unclear about the reasons for and motivations for creating food printing methods and their distinct characteristics. As a result, a comparison of the two methods is required.[1]

Food printing differs from other robotics-based technology in that it combines 3D printing (3DP) with digital gastronomy methods to create food items that can be mass customized in form, color, taste, texture, and even nutritional value. 3DP is a digitally controlled, robotic building technique that creates complicated solid structures layer by layer and fuses them together via phase transformations or chemical processes. The goal of digital gastronomy is to incorporate culinary processing information into food production so that our dining experiences extend beyond flavor to include all elements of gastronomy. Combining 3DP with digital gastronomy methods allows for digital visualization of food modification, opening up new possibilities for innovative food production at a low cost. As a consequence, a customized food design in the form of a digital 3D model will be immediately converted into a layered final product.[2]

1.1Food printer concepts and platform designs

The first phase of food printing concept ideas and models are becoming available to the general public. A few research programs, ranging from design concepts to in-depth study on material extrusion and deposition, have been completed in a short time.

A fast prototype and manufacturing technique for 3D food items, including a made - to - order birthday cake, was patented by Nanotek Instruments Inc. in 2001. However, there was no actual prototype created. Modern gastronomy was incorporated into the design of a meal generator in a lab contest. The goal of this idea was to use a tiny mechanical arm to print multiple materials and make a completely customized dinner out of ordinary food. Meal cartridges were developed by Philips Food Creation Printer to produce custom-designed food products layer-by-layer. To choose ingredients, amounts, forms, textures, and other culinary characteristics, an interactive user interface was suggested. This concept may be used for any kind of bespoke 3D food printing. However, all of these idea designs seem to be much too impractical to be implemented.Ingredients in electronic gastronomy may be decided based on internet nutritional content, personal and societal preferences. The three hypothetical ideas from the Massachusetts Institute of Technology (MIT) that incorporate a digital gastronomy concept into food printer design. Each one concentrated on a distinct element of cuisine, such as blending, modeling, and metamorphosis. These ideas appear to be more realistic than earlier concept designs, although they are still far from being technically viable.[3]

1.2 Food Printing Platform

The fundamental components of a food printing platforms are a three-axis XYZ stage (Cartesian coordinate system), distributing devices, and an interface. Such platform can handle food in real-time due to a machine three-axis motorised stage and materials feeding system. As according computer layout modelling and route planning, food content may be placed basically bullet points and layer by layer. At least four functionalities are suggested to create and customize new meals rather than merely automating the conventional food manufacturing process: measuring, mixing, dispensing, and cooking (heating or chilling) . In the present commercial or self-developed food printing systems, only the pouring and cooking features are provided.[4]

1.3 Commercial Platform-Based Food Printers

Researcher applied commercially available open source 3D printing platforms for foodstuff printing to simplify the design process and save development cycles. The most frequent change

is to replace an existing printer with a specifically designed dispensing unit and an extra valve to regulate material flow rate, or use a meal binder like starch mixes instead of conventional inkjet binder.[5]

However not particularly intended for culinary purposes, the Fab@Home system was one of the first desktop fabricators compatible with food ingredients. Frostruder MK2 was also utilized on the MakerBot platform to extrude frost, with two solenoids controlling the flow rate of creamy peanut butter, jelly, and Nutella . A food print platform with such a print head developed at the National University of Singapore. The platform is based on a Prusa i3 architecture that has been modified to include a self-developed extrusion printhead.[6]

1.4 Self-Developed Platform For Food Printers

Self-developed systems are constructed to meet specific needs, such as creating three - dimensional sugar structures with such a computer-controlled laser source , create a 3d cheese and chocolate artifacts from edible ingredients, or lowering the cost of free - form sweetener merchandise manufacturing with accessible hardware . They offer additional material dispensing options, allowing a suitable printhead to be developed and executed from a pool of candidates, as well as greater flexibility and optimization in dispensing settings and manufacturing processes.

Mechanical motions of the substrates and dispense head(s) are accomplished using a computer driven stage in both commercial and self-developed platforms. A 3d digital model may be transformed into multiple layer data (STL files) during the printing, and all these data can subsequently be translated into driven signals for stage drive motor through the controlled controller. The identical movement and pouring processes are repeated for each layer, each with its own unique form and size. These layers are combined and consolidated to create a full 3D model.[7]

Personal dietary has emphasized the idea of personalised food in terms of a person's health condition and body-type need, in addition to current nutritional preferences. Food printing may help people maintain a more precise diet by ensuring fresh, nutritious meals that are tailored to their specific requirements and tastes. It would have a substantial positive impact on the population's well-being. Food components, even those with well-known material characteristics, must be customized to unique formulas for each production in this instance. To get such highly personalized food items into every household, more work is needed.

1.5 Available Printing Materials

Pre-processing elements for 3D printing and increasing their thermal stability during post-processing have received a lot of attention. TNO proposes printing pureed meals to assist older individuals with chewing and swallowing issues. TNO also proposes customizing meals for elderly, athletes, and expecting women by changing dietary element amounts such as protein and fat. In general, the printability of current printing may be divided into two groups.[8]

- **Materials That Are Natively Printed**

Hydrogel, cake icing, cheese, hummus, and chocolate are all natively printed substances that can be extruded smoothly from a needle . In a finely ground 3d printing, a combination of sugars, starch, and mashed potato was tried as a powder material. For display purposes, a number of sugar teeth were created. Neither of these, however, are the primary dish of a meal. examined several traditional meals for printing, and most effective material was pasta dough, which was assessed by viscosity, texture, and solidifying characteristics. Taste, nutritional value, and texture of food items produced using natively printed materials may all be precisely regulated. Some natively printable materials are stable enough to retain their form after deposit and do not need additional processing steps, making them ideal for healthcare and space applications. Some

composite formulations, such as batters and protein pastes, may require a heating step after deposition. This will make it more difficult for food product structures to maintain their forms.[9]

- **Non Printable Traditional Food Material**

Rice, meat, fruit, and vegetables, which are widely eaten on a daily basis, are not printable by nature. Adding hydrogels to these solid materials has been authorized and used in various culinary areas to allow their extrusion capacity. Lipton et al. modified conventional food recipes using simple additions, resulting in complicated geometries and new formulas. While culinary techniques have previously been used to make solid meals and quasi liquids printed, it is difficult to test and alter the whole list. One possibility was to utilize a limited number of components to build a platform with a wide range of texture and taste options. A broad variety of textures (i.e. mouthfeels) may be produced by fine-tuning hydrocolloid concentrations. Cohen et al. investigated the structural requirements for post-processing materials such as protein pastes and cake mixes utilizing two hydrogels systems.

- **Food Processing**

To fully eliminate liquid ingredients from nutrient content, the food printing method does not need a significant source of energy. Fabricated layers do not need to be fully solid, but they must be stiff and strong enough to sustain their full load as well as the weight of succeeding layers before deforming or changing shape significantly.

After shaping, the bulk of traditional foods need post-deposition cooking, such as baking, steaming, or frying. Different degrees of heat absorption are involved in these activities, which result in texture that is not homogeneous The complicated interior geometries printed using a cookie recipe including cocoa modified substance were able to keep their form after baking.[10]

DISCUSSION

Food printer offer widespread skills to the commercial culinary sector while also introducing creative possibilities to gourmet dining. This allows for a high-value, poor food personalization process that is presently difficult to accomplish. It also includes research methods for manipulating the architecture of solid food items at various sizes. Because this technology is still in its initial phases of development, it is critical to comprehend its fundamental value and prospective commercial applications. Simultaneously, it is essential to keep track on technological advancements and related applications in order to determine how this new technology will satisfy customers' requirements and, possibly, alter people's lifestyles.

The majority of food manufacturing methods are designed for mass production, sacrificing culinary inventiveness and user control over forms, structures, and flavors. The food printer allows consumers to experiment with different food shapes and flavors. Previously, this customisation procedure necessitated the use of hand-crafted talents with a low production rate and an increased price. Meal print technologies have the potential to break down these boundaries by allowing home users greater flexibility in food customization design in terms of forms, colors, and flavors. It has the potential to create additional innovative solutions, such as customized chocolate shape, and full-color, customized graphics on solid food forms. Food printers will make it easier to adopt a cost-effective development approach. It is more cost effective to situate manufacturing facilities close to the end users. This may aid in the reconfiguration of the personalized food supply chain, allowing goods to reach customers in less time, at a lower cost, and with less resources.

Most food processing methods that include chemical and physical changes may not be compatible with 3D printing needs. This relates to architecture, texture, and taste, as well as

composition (ingredients and their interactions). Component compositions with a variety of combinations and manipulation circumstances may result in a wide range of textures in goods, some of which are unmanageable. In addition, the rigidity and strength of the print materials should be sufficient to withstand the weight of successive deposited layers as well as the heat impacts of the post-cooking process. In a nutshell, traditional food processing methods are unlikely to work in such a complex situation, and the entire process has to be redesigned. Pre-processing certain processes (e.g. gluten production and leavening) and substituting the other processes is an example (e.g. shaping and baking).

CONCLUSION

3D food printing has shown its worth by creating customized chocolate and basic homogeneous treats. These apps, on the other hand, remain basic, with restricted internal mechanisms and repetitive graphics. A systems approach to investigating print materials, platform design, printing methods, and their effects on food production is required. Furthermore, overall meal schematic design must be organized to encourage user creativity, the fabrication process must be defined to ensure optimal manufacturing outcomes, and a simulation to connect fabrication with nutritional management should be created. Meals printers may become part of an ecological system, where connected devices may purchase new ingredients, make beloved food on request, or even cooperate with physicians to design better diets, if an active open internet user interface is developed.

This article examines the evolution of food printing technology from idea to commercial machines. The two printer systems are utilized, as well as the printing experiment uses both natively readable and not printable conventional food components. Although there are a variety of food printing technology available, there is still a long way to go before they can be used commercially. Food printing has the potential to have a major impact on many kinds of food preparation, since it allows designers/users to modify shapes and materials with improved and unprecedented capacity, as seen in this technology review. This flexibility, whether used to home cooked food or caterer, may increase efficiency in delivering high-quality, freshly cooked food to customers, provide customized nutrition, and allow users to experiment with different tastes, textures, and forms to create whole different eating experience.

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THE QUALITY OF THE WOOL FIBER OF THE OFFSPRING OBTAINED FROM THE SHEEP OF THE KARAKALPAK SUR CATTLE BREED

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ABSTRACT

This article is devoted to the study of description of the wool's quality which is taken from the offspring of Karakalpak Sur Karakul rams in the experiments conducted in the limited liability company "Istiqlol Karakul Breeding" of Nurata district of Navoi region. Breeding and mating works are carried out on farms taking into account the high export potential and important features useful for the farm. Because although the barra in the herd has the same general characteristics in terms of skin characteristics and development, it may differ in its constitution or nasld characteristics.

KEYWORDS:*Bunch, Plum, Steel Sur, Red Belt, Barra Types, Silky, Glossy, Wool-Fiber Quality.*

INTRODUCTION

RELEVANCE OF THE SUBJECT: Today, the breeding of endangered animals is one of the most important zootechnical activities in improving the efficiency of the industry, improving the quality of products. It is noted that the quality of breeding sheep, the exportability of the flower type arise in different ways with different mating methods in the generations received from them. From this point of view, offspring are obtained by using various mating methods when obtaining breeding sheep on cattle farms. Homogeneous Barr-type mating serves to produce a certain type of lambs. And this makes it possible to predict in advance the color of lambs, the type of flower, the pattern, the quality of wool fiber that can be obtained on the farm.

Breeding and mating works are carried out on farms taking into account the high export potential and important features useful for the farm. Because although the barra in the herd has the same general characteristics in terms of skin characteristics and development, it may differ in its constitution or nasld characteristics. The high manifestation of the quality of sheep wool fiber causes a high appreciation of the skins. From this point of view, it is urgently necessary to study the quality of wool fiber, that is, its luster and silkiness, in the offspring of the sheep breed.

RESEARCH METHODS

The research work was carried out in the limited liability company "Istiglal Karakol" of the Nurotinsky district of Navoi region.

Based on the experience of scientists and pastoralists of the Karakul region of Uzbekistan, it is possible to distinguish Karakul sheep of Sur color, belonging to the type of Karakalpak breed, by the following colors [3; 56-57 AD]. In the Karakalpak hornbeam, the main inflorescences of spruce, apricot, steel and moon colors are present.

The underside of the wax wool fiber is intensely black, characterized by a sharp transition to white, as well as the presence of white wool fibers in the nasal part of the head.

Apricot is a multicolored skin with an excellent structure, the skin is divided into three zones according to the location of the amount of pigment in the wool fiber. The lower part of the wool fiber is characterized by a slow transition of black or dark color to light brown, and the upper part of the wool fiber is characterized by a milky white color. The wool cover is light yellow, the nasal part is covered with wool fibers of a milky white color.

The bottom of the steel fiber made of wool is black, characterized by a slow passage of steel or whitish color. The nose part consists mainly of steel-colored or light-white wool fibers.

The data obtained from the experiment were processed in the methods of variation statistics [1; 43 B., 2; 256B.]. The average Arithmetic index (X) of each sign, its error (Sx), was determined.

RESULTS OF THE STUDY

The silkiness of the wool coat depends on the amount of bristles and spikes contained in the wool, the length of the wool fibers, their thinness, tightness, The Shape of the flowers, as well as their location on the surface of the skin. Proceeding from these points of view, in the evaluation of the offspring of the breed of RAM, the silkiness indicators of the breed of wool coat were studied, and the data obtained were summarized in Table 1 below.

TABLE 1SILKINESS INDICATORS OF THE OBTAINED OFFSPRING WOOL COAT

Group of RAM	n	Silk spinning, % (X±Sx)		
		strong	normative	worthless
7,5-8,0 monthly generations of RAM				
Control	82	32,92±5,2	52,40±5,5	14,63±3,9
Experiment	95	35,78±4,9	52,63±5,1	11,57±3,3
In the offspring of Rams 17,5-18,0 months				
Control	87	35,63±5,1	50,57±5,3	13,79±3,7
Experiment	96	36,50±4,9	53,12±5,1	10,42±3,1

Analysis of Table 1 data shows that in the offspring of Rams aged 7,5-8,0 months, ipaximonity was 32,92% of lambs expressed in strong cinnamon, and the expression at the normative level was 52,40%. In the experimental group animals, there were cases of an increase in the indicators of expression of ipaximonality in strong and normative tailoring.

In the experimental group, it was determined that the expression of wool fibers in generations of Rams between the ages of 17,5-18,0 months in a strong and normative form was higher than in the control group. This led to an increase in the salinity of generations of quality received from Ram at the age of 17,5-18,0 months.

The ability of the wool coating to return light rays is called gilding. The luster of the wool coat is an important indicator, like silkiness. Well-expressed skins of this indicator are included in the upper classes.

The glossiness of the wool coating of the Spruce lambs will depend on the structure, shape and bending angle of the wool fibers when forming the pre-body layer of wool fibers. On the skin of lambs differ mainly strong, normative and inadequate species of lichen.

The results of the study of this indicator are presented in Table 2 below.

TABLE 2GENERATION OF WOOL COLLECTION

Group of RAM	**n**	**Shining, % (X±S_X)**		
		strong	**normative**	**worthless**
7,5-8,0 monthly generations of RAM				
Control	82	30,48±5,1	54,87±5,5	14,63±3,9
Experiment	95	33,68±4,8	54,73±5,1	11,57±3,3
In the offspring of Rams 17,5-18,0 months				
Control	87	34,48±5,1	52,87±5,3	12,64±3,5
Experiment	96	35,42±4,9	54,17±5,1	10,41±3,1

As can be seen from the table data, the strong expression of gilding in the offspring of 7,5-8,0 monthly control group Rams was 30,48%, the expression at the norm 54,87% and the insufficient level was 14,63%. In the generations of Experimental Group animals, there were cases of a decrease in the level of expression at an insufficient level, with a strong manifestation of luster.

In the offspring obtained from the control group Rams (17,5-18,0 months), gilding was observed to be 34,48% of the salinity of strong offspring and 52,87% of the salinity of lambs expressed at the normative level and to be higher than the rate of offspring obtained from Rams at the age of 7,5-8,0 months. In turn, the expression of luster in the offspring of the experimental group Animals at a strong (35,42%) and normative (54,17%) level decreased in contrast to the expression of the control group at an increased insufficient level compared to the control group. So it turns out that the offspring of the experimental group have higher qualities than the offspring of other group Animals.

CONCLUSION

In place of the conclusion, we can say that proper care and full-value nutrition of breed Rams have a positive effect on the high expression of the quality of wool-fiber obtained from them.

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THE USE OF THE ARTISTIC TRADITIONS OF UZBEK FOLK ART IN THE LESSONS OF FINE ART

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ABSTRACT

The article examines the formation of communicative, cultural and art criticism competence and, at the same time, spiritual and moral education of students based on the use of works in the lessons of the fine arts of Uzbekistan. In the conditions of independence of the Republic of Uzbekistan, education and the upbringing of a new generation capable of implementing the idea of national revival is one of the priority tasks of the state and society. The implementation of a targeted policy in the field of education as a priority direction of the socio-economic, spiritual and cultural development of society, logically led to the adoption of the National Model and Program for Personnel Training.

KEYWORDS: *Personal Development, Modelling, Decorative And Applied Art, Works Of The Fine Art Of Uzbekistan, Intersubjective Connections.*

INTRODUCTION

In the conditions of independence of the Republic of Uzbekistan, education and the upbringing of a new generation capable of implementing the idea of national revival is one of the priority tasks of the state and society.

The implementation of a targeted policy in the field of education as a priority direction of the socio-economic, spiritual and cultural development of society, logically led to the adoption of the National Model and Program for Personnel Training.

This conceptual model, which has no analogues in world practice, is designed taking into account the historical experience, domestic educational practice, as well as the experience and achievements of developed democratic countries in the field of education. This fundamental idea of the First President of the Republic of Uzbekistan I.A. Karimov found practical embodiment in the National Program for the Training of Personnel of the Republic of Uzbekistan.

An integral part of the National Program for Personnel Training is the national model, the implementation of which will solve the problem of forming a harmoniously developed, highly spiritual, free-thinking personality, responsible for the present and future of Uzbekistan.

Among the main components of the national model of personnel training, personality and lifelong education are the first to be named. The main task of lifelong education at the present stage is not only to provide deep knowledge, to form strong skills and abilities but also to develop the personality of the student in its uniqueness.

MATERIALSANDMETHODS

In solving problems as a system of embodying the values of culture and the formation of the student's personality, owning the cultural meanings of his own culture, an active search for the most effective technologies in the classroom and extracurricular activities in schools, universities, especially artistic-aesthetic, creative, pedagogical, continues, to familiarize the younger generations with the spiritual values of the people, its history, embodied in works of art and culture, including paintings by Uzbek artists. “So, what is special in the artistic culture of peoples is determined by far not only by customs and rules but by something more permanent. This is the nature of the region and a way to live, work and enjoy. These traits, developed by people's trials in historical events, are the ability to experience them. Finally, it is the very structure of feelings, the very perception of life, which develops in the course of the history of the people. It is all this that determines that special inner rhythm of art, which can be felt in folk art. It betrays the most intimate differences in national identity or national character since it determines not only their dependence on the place, climate and historical facts but, first of all, on the psychological makeup of the people.

This inner rhythm has been developed over the centuries. It determines the peculiarities of the people's world, in each case; it carries its own experience of space and time, its system of values. All this ultimately creates a unique spiritual reality of every nation” [1,2].

Folk arts and crafts have a long history and traditions dating back to antiquity. They are diverse. Such a unique set of types of folk art, which our Republic of Uzbekistan has, is relatively unavailable in others. “The tradition created by the artistic genius of the people plays a huge role in the national specifics of art” [2].

The historical development of folk crafts is a part of the culture of our society and it affects professional art, the formation of artistic tastes of children. Many researchers of folk decorative art note in their works the kinship of the worldview in the work of folk craftsmen and children, the basis of which they saw in a clear rhythm, ornamentation. It is believed that naivety and spontaneity are inherent in folk art, which is why it is so close and understandable to children, and therefore should play an important role in their aesthetic education. In the new program of fine arts, at modelling lessons, children get acquainted with the folk crafts of their region. These lessons provide profound opportunities for the development of figurative perception of works of folk art, which is now given great importance. The program requires teaching children to work, choosing a form, taking into account the transfer of the figurative state of the selected characters. And folk art, in particular, clay toys, helps us to convey the figurative state. The preservation of traditional arts and crafts from generation to generation is especially important. A peculiar and original artist Khamro Rakhimbaeva sculpts from white clay characters of folk epics based on folk national motives. Sheep with branchy horns are fabulous monsters with large ears and eyes. Each figurine has huge educational goals and is associated with an epic, fairy tale, folk epic. And although these toys are stylized, we can accurately tell which toy has which character. Children, however, feel all this very subtly and deeply. But they need a mood for imaginative perception, which the teacher can give, explaining new material, focusing on the figurative combination of works. For more complete assimilation of folk art by children, lessons on the perception of art are given before practical work. In the lessons of perception, dedicated to arts and crafts, students become widely acquainted with various artistic crafts of their people, reveal the distinctive features of individual crafts. Knowledge of folk traditions, the ability, for example: to

guess the homeland of toys by colour, ornament and shape, greatly facilitate practical exercises, making them more interesting and exciting. So, for example, it is necessary to comprehensively conduct classes on the perception of art and modelling in grade 4. First, there is a lesson in the perception of art, the purpose of which is to develop the ability to feel the beauty of the works of certain artistic crafts, to give an idea of the specifics and history of clay toys and works of folk crafts in their native land. In the next lesson of practical activity, students perform a relief tile/sculpture/. To complete the practical work, you should slightly change the topic of the previous lesson - the lesson of perception. In this lesson, we propose to familiarize students in more detail with the Uzbek national tile art that arose in the early period.

Particular attention should be paid to the plot content of the relief tile.

Stories about folk art should begin with the showing of video films ("Folk Craft of Uzbekistan"), colour reproductions, filmed in the homeland of a particular craft.Pictures of nature, architecture, painting, dishes, and clothes. The children must observe for themselves, identifying features of stylistic unity. It is important to accompany the slides with the necessary recordings of the masters themselves, fairy tales, epics, epics, legends and songs.

Especially song and music help to enter the art, to tune in to a subtle perception of beauty, connects the experience with the beauty of the native land, the talent of its masters.

In order to interest the children, the teacher himself needs to feel the beauty and power of the works of folk artists and help the child in this to enrich his own practice. Therefore, it is so important for the teacher to conduct conversations and exercises to identify the main artistic features of toys and then creative tasks that involve the use of the qualities they like. We believe that the student will be interested if the teacher does not give dry scientific data, but tries, as it were, to revive this or that subject. The teacher can even compose a fairy tale or a legend about a toy, for example, for one of the lessons we have compiled a legend about a cruel stone boy. “A long time ago, in the old days, a husband and wife lived. its shape resembled the figure of a little boy.

Something trembled in the woman's heart, she began to ask her husband to pick up the stone and bring it home. Then the husband agreed. And the wife began to look after the stone every day, to warm it so much that the stone could not stand it, came to life and turned into a little boy. But his heart remained stone. He was angry and cruel, offended the younger and rude to the elders. He brought a lot of evil to people. Then day and night the poor woman cried, she did not find herself joy in the stone son. And she decided that a man with a stone heart could not live among good people and asked Allah to turn him to stone again. Allah fulfilled the woman's request and turned the evil boy into a stone idol". This fairy tale was invented by the teacher to increase the students' interest in completing the practical task. Many children will be excited by this fairy tale and they will fashion a boy with an evil face.

Telling tales, legends, there were, teachers, give their speech a folk character. And this language becomes more understandable for schoolchildren, shows in them a creative stimulus, a desire to touch folk art with their own hands, create a toy, tile, painting. The tale can be used by the teacher in various ways.

Firstly, it is used to accentuate attention, to raise interest in practical activities; secondly, a fairy tale can also serve as a task. The teacher chooses a passage from a fairy tale, and the children complete the assignments based on this passage. Thirdly, the children can be invited to compose a fairy tale themselves and to do practical work according to their own fairy tale.

As we have already noted, it is impossible in fine arts lessons to do without slides, music, fairy tales, songs, literary works, without something that reflects and enriches people's life and everyday life. The teacher's speech bears some kind of national character if he uses certain

Uzbek sayings and fairy tales. All this facilitates the work of students, helps them to get closer to folk art. It is easier to acquaint children with Uzbek folk art because it is closer and more understandable to them; they often meet with it in everyday life. And if the children are offered to sculpt their deskmate, friend or relative, then they will gladly take on this task. Here you can also use old legends and students need to create their image, close to the image of a fairy tale, and send them in search of expressiveness.

At the end of the lesson, it is necessary to analyze student work, taking into account the figurative state of the characters chosen by the children.One of the valuable forms of work in this regard is the use of works of fine art, paintings by Uzbek artists, depicting their native nature, the typical way of life, familiar images of people, in general - the dear appearance of the homeland.

Display of a stand with reproductions on the topic; “Mother” of the famous paintings by Uzbek artists R.Ahmedov “Morning. Motherhood"and"Maternal Meditation", B. Dzhalalov"Mother", V. I. Burmakin"Baysun Madonna", N. V. Kashina"Samarkand Madonna", famous paintings by Italian Renaissance artists Leonardo da Vinci"Madonna Litta", Raphael Santi “Sistine Madonna”, Russian artist K.S. Petrov-Vodkin “Mother”.

The teacher concludes: A woman-mother gives each of us, be it a genius or a mere mortal, the most precious thing in the world - life.Women of all nationalities, speaking different languages: scorched by the sun and barely warmed by it in the Far North - they are all sisters in a single restless burst of feeling, the same when they bring a child to their breast.The whole world was fed by the breast of a woman, and the whole world fell asleep to her lullabies.Further, an analysis of the painting by the Uzbek artist Rakhim Akhmedov is given in detail. Examination of the reproduction of the painting “Morning.Motherhood ”is accompanied by the teacher's story: The world of his homeland, understood by the heart of the artist, is embodied in the works of R. Akhmedov. Boldly breaking the usual, traditional images of an Uzbek woman, R. Akhmedov paints the picture “Morning. Motherhood”.

For the first time in the art of Uzbekistan, the artist seems to secretly invade the hitherto carefully guarded side of life. The painter embodies the idea - mother and ever-changing nature is the beginning, the source of all life.Everything here is very earthly - the image of a mother sitting in a typical national pose, and a sleeping child, and nature with a wide panorama of fields, a ridge of blue mountains and young poplars trembling from the wind.At the same time, this real-world is surprisingly poetic, endowed with a sense of spring, the joy of the awakening morning.The soft colouring of the picture consists of light green, blue-blue, yellow, dark brown tones.Then a conversation is held on the content of the picture: What is this picture about? Who is in the centre of the picture?How are a mother and her child depicted? What feelings did the artist express?Do you like the image of a young mother created by R. Akhmedov?Did the artist manage to convey the freshness and beauty of a young woman bending over her baby?What colours does the artist use to awaken in us a light, joyful mood when perceiving this work?What impression did the painting make on you?Why do you think the painting is called “Morning. Motherhood"?In what details of the picture is the national (Uzbek) flavour manifested?In the next lesson, the attention of students is drawn to another picture by R. Akhmedov "Mother's Meditation".

It was not by chance that the artist's thoughts turned to the images of women, to those who, during the war years, carried on their shoulders the main burden of rear services and collective farm work.The artist's idea of an Uzbek woman, her spiritual beauty, inner strength, humanity, dignity was embodied in the painting "Mother's Thought".A student prepared in advance tells the story of the painting: In the summer of 1956, Rakhim Akhmedov spends in the mountain town of Burchmulla, lives in the house of an old single woman.

In the afternoon he leaves to write sketches, and on long summer evenings, over a bowl of tea, he has leisurely conversations with the hostess.An old woman tells about herself, and a heart-pounding, tragic story is revealed to Rakhim ... During the war, her husband and two sons were killed. It seemed that great grief could not be overcome.But work, people helped me to survive.

Old age has come, and loneliness. “I did not notice,” Rakhim recalls, “how I fell in love with this woman, I fell in love like a mother” [3].

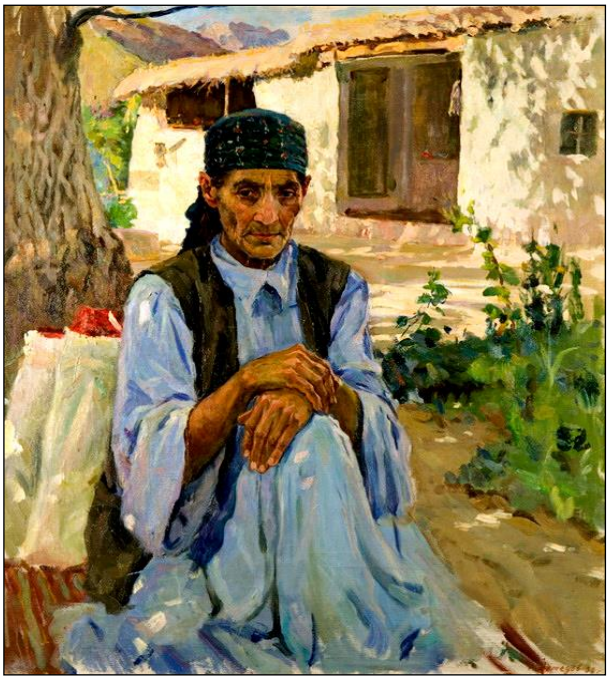

Figure 1 R. Akhmedov. Thought

This is followed by a conversation with the class on the following questions: Who is depicted in the picture? How is an old woman, a mother, who lost both her husband and sons at the front, is depicted? Pay attention to her portrait: what is her face, eyes, mouth, cheeks, what are the hands of the woman, what is the figure, the posture? What about the character of this mother? Did grief suppress her, how did she remain firm and courageous? How does the artist emphasize this woman's will to live? (Note the proud posture of the old woman and the crooked old tree. What did the artist want to emphasize with this comparison?) How does this picture, the image of your mother, make you feel? Using reference words and expressions, the students compose a description of the painting: The painting depicts a woman immersed in her thoughts. She has a sad face, large light eyes, brown shadows under them, a compressed mouth, sunken cheeks. Tired hands lie wearily on their knees. In the centre of the picture is the figure of a woman, she is pushed forward, which emphasizes her scale. The erect posture of the figure, a posture typical for an elderly Uzbek woman, conveys a feeling of inflexibility and firmness.

Figure 2 А.Абдуллаев. Большая семья

This is emphasized by the comparison with the curved trunk of an old tree. Further, the students recall that the fate of the heroine of R. Akhmedov's painting is similar to the fate of the heroine of Ch. Aitmatov's story “Mother's Field”, the Kirghiz collective farmer Tolgonai, who lost her beloved husband and sons in the war, but despite all the troubles she did not break down, did not lose heart. Further, they formulate the conclusion that the picture of R. Akhmedov for them is all the mothers of the Motherland; these are the women of Uzbekistan who, during the Second World War, performed their patriotic, international, simply human duty, adopting children who lost their parents on the military roads. They remember the noble deed of Bakhrikhon Akramova and her husband, the blacksmith Shaakhmed Shamakhmudov, who accepted fourteen boys and girls of different nationalities into their home.

A poem by the Uzbek poet Gafur Gulyam "You are not an orphan!" “Let us bow to the woman, let us bow to the one who will tirelessly give birth to great ones! Aristotle, her son, and Firdavsiy, and sweet as honey, Saadi, and Omar Khayyam, Iskander and the blind Homer - these are all her children, and she brought everyone into the world by the hand, when they were no taller than a tulip - all the pride of the world - from mothers! " (M. Gorky), “Without the sun, flowers do not bloom, without love there is no happiness, without women there is no love, without a mother there is no poet or hero” (M. Gorky).

Further, in continuation of the lesson - pride for the native land, for the ancient culture of his people quotes from the hadiths of the Prophet Muhammad: First bow to your mother, again and again, and then to your father.Anyone who wants to go to heaven must receive the blessing of the mother.

And here they recall Odil Yokubov's work “Everything will return to normal”, which tells that a son who made a pilgrimage to Mecca and returned to his homeland must first come to his mother and bow to her.

CONCLUSION

Opening the world of beauty to a child, making him sensitive to the beautiful and teaching him to appreciate the beauty and create beauty with his own hands is not easy and not easy, but necessary.It is necessary to answer to raise and educate children capable of familiarizing with folk art, mastering the picturesque paintings of artists with its imagery are the conductors of the living tradition of art.

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DOPING AND STIMULANTS IN SPORTS: A MENACE AND THREAT

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ABSTRACT

Doping in competitive sports is when an athlete uses a banned drug to enhance their performance, such as those found in performance-enhancing medicines. Doping is a term used by organisations charged with monitoring sports competitions. The International Olympic Committee for example, forbids athletes from taking performance-enhancing drugs because of this. Deliberate attempts by athletes (or sports programmes) to evade detection are exacerbated by overt dishonesty and cheating. A lengthy history of doping in sports goes all the way back to the beginning of the sport itself. Recently, the use of performance-enhancing substances in baseball and cycling has been a topic of discussion, although views about these problems have changed significantly over time depending on where you live. For many years, governments and sporting organisations have strictly controlled the use of performance-enhancing drugs and chemicals in sports. As a result of health concerns, equality of opportunity for athletes, and the public relations benefit of drug-free sports, it was decided to ban the use of performance-enhancing substances. Anti-doping authorities argue that using performance-enhancing drugs goes against the "spirit of sport."

KEYWORDS: *Doping in Sports, Use of Drugs in Sports, Stimulants by Sportspersons.*

INTRODUCTION

Drug usage in sports has a long history, dating back to the birth of the sport itself. Athletes and soldiers who were chosen because of their physical fitness were given special diets and therapies to assist them gain muscle mass in ancient times. A combination called "butotens," according to Scandinavian legend, might make Berserkers stronger, but at the risk of becoming insane. The Amanita muscaria mushroom has been implicated as the source of the combination, although this has been refuted.

There have been allegations of doping in the ancient Greek Olympics. Herbal infusions were used by ancient Roman athletes before chariot races, since chariot racing had become a significant aspect of Roman society.

Another example from the 19th century is Abraham Wood, a competitor in a 24-hour walking competition in Britain, who claimed to have taken laudanum (which includes opiates) to keep him awake. Agricultural Hall in Islington, London, in April 1877, walking races extended to 800 kilometres (500 mi). The next year, the distance was increased to 840 kilometres (520 mi).

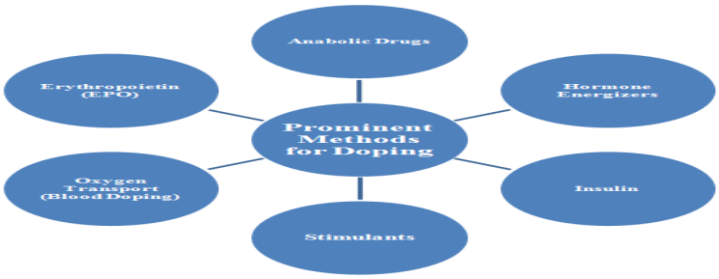

Figure 1: Methods of Doping in Sports

Even while knowing that a person can travel 520 miles in 138 hours and make it through a week on a sliver of sleep may be useful in certain situations, we fail to see how this talent could be put to good use for anybody, or what would be achieved by repeatedly repeating the information.

However, the event was a huge success, drawing in an average of 20,000 people each day. When the concept was well-received, the organisers began holding similar events for bikers.

"A weary pedestrian just sits down; a fatigued biker falls off and may drag others down with him. They are far more prone to suffer in public. That seems like a lot more fun "'s a good place to start.

Six-day cycling races sparked interest on both sides of the Atlantic, drawing large audiences in both countries. To add insult to injury, as more people paid their admission fees, so rewards might be larger, and riders would have more of an incentive to ride as long as possible by staying awake—or being kept awake—to do so. Soigneurs (the French term for "healers"), assistants similar to boxing seconds, countered their weariness. Nitroglycerine, a medication intended to stimulate the heart after a heart attack and which was credited with helping riders' breathing, was one of the therapies they provided. Rider fatigue and/or medications may have caused hallucinations. According to Major Taylor, who declined to continue the race because a knife-wielding pursuer was following him around the ring, he couldn't carry on with safety.

The public reacted negatively to any kind of trial, whether it was a solitary race or a team competition. According to one account:

A sporting event in which the competitors 'get weird' in their minds and stretch their abilities to the point where their faces turn ugly from the tortures they are subjected to is not sport, it is cruelty. According to eyewitness accounts of this bizarre show, several of the cyclists went momentarily crazy during the competition... To get the racers back in shape, it will take days or even weeks of rest, and some of them may never fully recover from the stress.

During the mid-20th century, a physician for the United States weightlifting team, John Ziegler (1917–1983), was the father of anabolic steroids in the United States. In 1954, Ziegler discovered from his Russian colleague that the Soviet weightlifting team's success was attributable to the usage of testosterone as a performance-enhancing substance during his team's world championship trip to Vienna. Ziegler collaborated with the CIBA Pharmaceutical Company on the development of an oral anabolic steroid after concluding that US sportsmen need pharmacological help to stay competitive. In 1960, under the brand name Dianabol, methandrostenolone was introduced to the market. Knud Enemark Jensen, a Danish cyclist, died

in the 100-kilometer (62-mile) event at the 1984 Summer Olympics. Amphetamines and a medication called nicotinyl tartrate were found in his system after his death, according to an autopsy.

According to Max M. Novich, a leading doping expert in the United States, "Trainers of the old school who provided treatments which contained cocaine as their basis stated with confidence that a rider weary after a six-day race would acquire his second breath after ingesting these combinations" 6 day races are "de facto studies studying the physiology of stress as well as the drugs that may relieve fatigue," according to University of Texas Austin professor John Hoberman.

Prevalence

Athletes competing at the 2011 World Athletics Championships confessed to using performance-enhancing drugs (PEDs) at some point in their careers. WADA commissioned a research that found that 44% of athletes had used performance-enhancing drugs in the last year. Despite this, just 0.5% of individuals who were subjected to testing were found to be carriers.

Since Russia's state-sponsored doping programme effectively sanctioned that country's athletes, the entire Russian track and field squad was barred from the 2016 Olympics.

Bob Goldman, a physician, osteopath, and publicist, presented the Goldman conundrum to top athletes, asking whether they would take a medication that guaranteed their success in sports but caused them to die five years later, or not. As in earlier Mirkin studies, around half of the athletes said they would take the medication. However, more recent study by James Connor and colleagues has shown that this figure is considerably lower, with athletes showing acceptance of the issue at a level comparable to the general Australian population.

Substances for Doping

Doping in sports is most often accomplished with one or more of the following substances: Well-known stimulants include things like caffein, cocaine, amphetamine, and modafinil, as well as ephedrine and other similar substances. Despite its reputation as a stimulant, the International Olympic Committee and the World Anti-Doping Agency have not banned caffeine since that year. Most often, anabolic steroids are used to enhance muscular growth and strength. Drugs that enhance enthusiasm while decreasing tiredness are known as stimulants (the second most prevalent kind).

Steroids for anabolism: First discovered in the 1930s, anabolic-androgenic steroids (AAS) are currently being used therapeutically in medicine to promote bone development, increase appetite, speed up puberty in men, and treat chronic degenerative diseases like cancer and AIDS. As a result, anabolic steroids are popular in sports and bodybuilding, where they're utilised to boost performance or physique. On the other hand, there are known adverse effects, including as elevated levels of low-density lipoprotein (LDL), acne, high blood pressure, and liver damage. Supplemental medications may help with some of these side effects.

At the beginning of October 1954, the American weightlifting team travelled to Vienna with a doctor who treated their players, Dr. John Ziegler. There he met a Russian doctor who frequently questioned him, "What are you feeding your boys?" over "a few beers." When Ziegler asked the Russian about it again, he revealed that his own athletes were given the drug. In the United States, Ziegler tested low testosterone dosages on two weightlifters, Jim Park and Yaz Kuzahara as well as on American trainer Bob Hoffman. No training regimen could have given them the results they got without it, but there were consequences. After searching for a medication with no side effects, Ziegler came upon the anabolic steroid methandrostenolone (marketed as Dianabol in the US in 1958) manufactured by Ciba (colloquially known as "d-bol").

International Perspectives

Former U.S. Olympic Committee drug-control administrator Wade Exum handed over documents to Sports Illustrated in 2003 revealing that approximately 100 American athletes failed drug tests between 1988 and 2000, arguing that they should have been barred from competing in the Olympics but were still allowed to compete. These athletes included Carl Lewis, Joe DeLoach and Floyd Heard. Exum attempted to use the papers in a lawsuit against the USOC before revealing them to Sports Illustrated, alleging racial discrimination, wrongful termination, and a cover-up of the failed tests. His lawsuit was dismissed outright by the Denver Federal Court due to a dearth of evidence. It was deemed "baseless" since he was in charge of screening the organization's anti-doping programme and confirming that the athletes had been approved in accordance with regulations, as stated by the USOC.

At the 1988 Olympics trials, Carl Lewis tested positive for minimal quantities of prohibited stimulants pseudoephedrine, phenylpropanolamine and ethanol three times, according to Exum's records. Cold medications often include bronchodilators as well. His case might have resulted in his being disqualified from the Olympics and banned from participation for a period of six months under the regulations. The total stimulant levels were found to be 2 parts per million, 4 parts per million, and 6 parts per million in the various tests. Lewis stood by his storey, saying he had inadvertently ingested the illegal drugs. Following an examination of the supplements he had taken to support his claims, the USOC approved his claim of unintentional usage after discovering that one of the pills he had taken included "Ma huang," the Chinese term for Ephedra (ephedrine is known to help weight-loss). Joe DeLoach and Floyd Heard, both members of the Santa Monica Track Club, were also tested positive for prohibited stimulants but were allowed to participate nonetheless. For a short time in 1988, 6 ppm of Lewis' stimulant concentration was considered positive; however, that is no longer the case. Because of this, the allowable concentrations of ephedrine and other chemicals have been increased from five to 10 parts per million. Positive tests at levels less than 10 ppm were subject to additional inquiry but not an instant suspension, according to IOC regulations at the time. This is what you'd observe in someone taking cold or allergy medications, according to Neal Benowitz, an expert on ephedrine and other stimulants at UC San Francisco, who concurred that "These [levels] are unlikely to have any impact on performance." IAAF recognised that the USOC did indeed follow the proper procedures in dealing with eight positive results for low concentrations of ephedrine and ephedrine-related substances in 1988 Olympic Trials after hearing from Exum's testimony. Also in 1988, the federation conducted a review of the relevant documents without disclosing who the athletes were and found that "the medical committee felt satisfied, on the basis of the information received, that the cases had been properly concluded by the USOC as 'negative cases' in accordance with the rules and regulations in place at the time and no further action was taken.

Eight of the United States' gold medals at the Olympics were revoked because of drug offences. Athletes sanctioned for doping violations acted independently of the US government or the US Olympic Committee (USOC). For example, the United States Olympic Committee (USOC) in 2001 acknowledged swimmer Rick DeMont's gold medal performance from the 1972 Summer Olympics, but only the International Olympic Committee (IOC) can restore his medal, and the IOC has refused to do so as of 2017. DeMont had previously won the gold medal in the 400 metre sprint with a time of 4:00.26. It took the IOC until after the race to take away his gold medal because he tested positive for the prohibited drug ephedrine in his prescription asthma medicine, Marax, during the post-race urine. After a positive test in the 400-meter freestyle final, he was disqualified from competing in any other events at the 1972 Olympics, including the 1,500-meter freestyle, where he held the world record at the time. This cost him a shot at several medals. The USOC failed to get clearance from the IOC's medical commission for DeMont's

asthma medicines before the Olympics, despite the fact that he had disclosed them on his medical disclosure papers.

FIFA believes education and prevention, together with ongoing testing both within and outside of competition, are critical to ensuring that high-profile sporting events are free of performance-enhancing substances. As a result, there have been very few instances of doping in football. A joint statement signed by FIFA officials and team doctors says that they support regular blood testing to look for signs of blood doping before any FIFA World Cup.

There was an introduction of the biological passport in 2014 at the FIFA World Cup; the Swiss Laboratory for Doping Analyses examines blood and urine samples taken from all players before to participation and from two players per team and each match.

The UFC launched a year-round random drug testing programme in December of that year. Despite the fact that random testing was difficult for the organisation, fighters who tested positive had to be removed from bouts, which hurt fight cards and therefore pay-per-view sales. Fights would have to be cancelled if the UFC couldn't locate a substitute. Since the program's inception, approximately 31% of UFC competitors who have been randomly tested for the use of performance-enhancing substances have failed. In other words, for every sixteen random screens, there are around five failed tests.

Beginning in July 2015, the UFC has pushed all commissions to require drug testing before every event. Lorenzo Feritta, who at the time was one of the presidents of the UFC, said, "We want 100 percent of the fighters tested the night they compete". As a result, in addition to the standard pre-fight drug testing, the UFC now tests athletes who are scheduled to participate in title bouts on fight night. Tests for performance-enhancing substances will be conducted on both urine and blood samples collected 'out of competition,' as well as at predetermined intervals. The UFC also stated that before being given a contract with the organisation, all prospective UFC signees would be subject to a required pre-contract test for performance-enhancing substances.

Sports that need stamina and perseverance: In a variety of sports, the use of performance-enhancing chemicals has grown to be a growing issue. Any chemical or drug that provides an athlete an unfair edge over a "clean" athlete qualifies as performance-enhancing drug use. The prohibition of these substances encourages fair play and equality for all athletes. Since it gave swimmers an unfair advantage via hydrodynamics, the wearing of "the suit" during competition was outlawed internationally. Athletes' medication regimens vary significantly depending on the sport's performance requirements.

Endurance athletes use erythropoietin (EPO) to boost their red blood cell count, which results in more oxygen-rich blood and a greater VO2 max. In endurance sports like swimming, long-distance running, cycling, rowing, and cross-country skiing, a person's VO2 max is strongly linked with their performance. EPO has lately become popular among endurance athletes because of its potency and poor detectability compared to other doping techniques like blood transfusion. Although EPO was extensively used by sportsmen in the 1990s, there was no method to test for the drug directly until 2002 since there was no specialised screening procedure for testing athletes. Blood and urine tests are used to check for EPO levels in Olympic athletes. The risk of doping in certain endurance sports may be reduced by following strict rules and restrictions.

When it comes to doping, elite athletes are driven by financial competition, which is different from recreational athletes' interests, elite athletes have different incentives. The pressure to physically perform is a recurring element in these reasons. A survey of 101 people found that 86% said that the possibility for athletic success impacted their usage of performance-enhancing drugs, 74% said that the economic element was important, and 30% said that self-confidence and

social recognition played a role in their decision. It was shown that athletes utilised performance-enhancing pharmaceuticals for therapeutic reasons in another research of 40 individuals in order to be competitive in top sports for the monetary incentives associated with them. The societal and physical demands to have a particular body type are often intertwined. Muscle dysmorphia is a condition in which a person desires a more muscular appearance for practical and self-esteem reasons. Preventing nutritional deficiency and bolstering the immune system are the most common reasons why athletes use supplements. All of these aspects are geared at making the body more efficient so that it can function better.

Psychiatric factors

Doping in sports requires consideration of a variety of factors, including psychology. Recognizing and participating in doping despite the health dangers becomes a behavioural problem for the athlete. To put it another way, many take it because they believe it would make them feel invincible. Because they believe the performance-enhancing medication provides the outcomes, the people are driven only by their own egos and the drug's promise of increased performance. There are three distinct psychological factors that drive someone to dope: social cognition, stress and strain, and addiction, according to a research on health psychology conducted by Quirk the "doping dilemma" occurs when social and physical constraints drive athletes to feel that they must use performance-enhancing substances to keep up with their peers.

Legal Perspectives on Doping

• The World Anti-Doping Agency was established in 1999 after an initiative by the International Olympic Committee to combat doping in sports. The International Olympic Committee (IOC) established WADA in the wake of the 1998 cycling doping crisis to promote, coordinate, and monitor the fight against doping in sports. Montreal, Canada, is home to WADA's main office. With this power, WADA may conduct dope tests and decide which drugs are prohibited.

• Play Asterisk Free, an anti-steroid campaign targeted at teenagers, was launched in February 2011 by the US Olympic Committee and the Ad Council. The "Don't Be An Asterisk!" campaign was originally introduced in 2008 with that moniker.

Cyclist Lance Armstrong was found to have used performance-enhancing drugs by the United States Anti-Doping Agency (USADA). "...scientific data and laboratory test findings further show the usage, possession and distribution of performance-enhancing substances," said USADA CEO Travis T. Tygart.

S. 1829, the Steroid Trafficking Act of 1989, was proposed by US Senator Joseph Biden on November 1, 1989. The act's goal was straightforward: It would "To further limit the use of anabolic steroids, the Controlled Substances Act should be amended. The bill would make anabolic steroids a Schedule II restricted drug, making them more difficult to get legally "'s a good place to start. p. 282) of the Senate Judiciary Committee's report.

The athlete will be requested to give a urine sample as part of the approved doping control procedures. The sample will be split in half and stored in sealed containers carrying the same unique identifying number and designation as A- and B-samples, respectively. The findings of a confirmation test on sample A showed that the athlete's B-sample also tested positive for a banned drug, therefore an examination of the B-sample was ordered. Test results are regarded positive if the B-sample test results match the A-sample findings; otherwise, they are termed negatie if they differ. The individual's security is ensured by this validation procedure.

An erythropoietin recombinant blood test may identify the use of illicit performance-enhancing substances by measuring markers that change when the drug is used.

1. Hematocrit

2. Reticulocytes

3. Iron Levels

Combustion-IRMS Gas Chromatography

Any deviations from the standard in the isotopic composition of an organic molecule may be detected using gas chromatography-combustion-IRMS. When synthetic testosterone is taken, the T/E level raises abnormally, and this test helps determine whether that's the case.

Athletes may make themselves inaccessible during testing times to avoid getting examined. Athletes are required to disclose their whereabouts at all times to help minimise this. The same as rejecting a drug test is deemed a doping violation if planned doping tests could not be performed because the athlete could not be located three times a year. Athletes are required to record their whereabouts through an app and a website called ADAMS.

Donald Berry has raised concerns about the validity of several standardised exams in an essay published in Nature. According to Berry's paper and an accompanying editorial, these concerns include:

In his argument, it is claimed that anti-doping authorities have not sufficiently specified and publicised how they arrived at the criteria used to decide whether or not a test result is positive. [...] Individual laboratories must validate these detection limits in bigger groups, including both known dopers and non-doers, under blinding circumstances that mirror what occurs during competition, according to Berry. An arbitrary test for which the percentage of false positives and false negatives can never be determined, according to Nature, is what the editorial concludes with. According to a wired article by G. Pascal Zachary, allowing performance-enhancing drugs and genetic modifications would fulfil society's need for übermenschen and restore public interest in sports.

CONCLUSION

Athletes are held to moral standards by society but do not live up to those norms themselves, say sports researcher Verner Moller. According to an article written by Fox Sports' Jen Floyd Engel, "We live in a culture that relies heavily on pharmaceuticals. We live in a world where shortcuts are taken, where things are faked or improved, and yet we continue to push the narrative that sports have devolved into a corrupt cabal of corruption. Athletes are just doing what so many of us do every day of our lives: celebrating and watching." Transfusing blood cells is not permitted, but other ways of increasing the number of blood cells, such as hypobaric chambers, are acceptable, according to sociologist Ellis Cashmore. Similar arguments have been put forward by other academics. Individual sports governing organisations' anti-doping rules may be at odds with state and municipal legislation. When a federal judge decided that municipal labour rules trumped the NFL's anti-doping system, the NFL found itself unable to discipline players who tested positive for prohibited drugs. The NFL Players Association lent their support to the cause. Athletes who use performance-enhancing drugs (PEDs) may face sanctions from both their local and national regulatory bodies. Depending on where you live, anabolic steroids may or may not be allowed in your nation. If Bill S-209 is passed, fighters who are caught taking performance-enhancing substances in mixed martial arts contests (such as the UFC) may be subject to civil and criminal prosecution. Athletics may be given a therapeutic use exemption if they need the use of an otherwise illegal drug to address a medical ailment.

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AN ANALYSIS OF CHALLENGES AND SIDE EFFECTS OF HEAVY METALS IN AGRICULTURE

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ABSTRACT

When heavy metals are exposed to stress, they declinate into molecular oxygens, releasing highly reactive transitional chemical products such as hydrogen peroxide (H2O2), superoxide radicals, and hydroxyl radicals, all of which are classified as reactive oxygens. Heavy metal pollution is a serious global environmental problem because it disrupts plant growth and causes genetic dissimilarity. Heavy metals, both necessary and non-essential, have similar fatal effects on plants, such as poor biomass accretion, chlorosis, growth inhibition, photosynthetic inhibition, altered water balance and nutrient integration, and senescence, which ultimately leads to plant disease. The goal of the research was to look at the impacts of heavy metals on plants and biological systems, as well as remediation techniques. Precipitation, Biosorption, Ion Exchange, and Filtration are all efficient techniques for overcoming this issue, but they are not cost-effective. Phytoremediation was shown to be the most efficient and cost-effective method in this respect. Although bioremediation seems to be the greatest option, it does have certain drawbacks. In order to use this technique effectively, a longer study must be accompanied in order to decrease the constraint.

KEYWORDS:*Agriculture, Anthropogenic, Metals, Pollution, Soil.*

1. INTRODUCTION

Human usage and management of water and soil resources have impacted the growth, survival, degradation, and revival of anthropoid advancements supported by agriculture. Soil and water are essential natural resources for the domesticated food production system based on plants and animals. Despite the fact that soil is often referred to as the "productive substrate," not all soils are suitable for crop development. In ideal agricultural soils, mineral inputs, soil organic matter, air, and water are all present. The balanced contributions of these components enable water retention and drainage, root zone oxygen, nutrition to assist yield growth, and plant physiological care. The circulation of soil components in a particular soil is influenced by five factors: parental material, time, weather, species, and landscape[1].

Each component has a direct and overlapping impact on the suitability of a soil for agricultural use. Agriculture disrupts the natural cycle of nutrients in soil. Plant nutrients may be extracted from the soil using precision agronomy and harvesting of crops for human and animal use. To maintain soil richness for sufficient yield harvests, soil amendments are generally required. To improve soil fertility, early hominids used animal dung, charcoals, ashes, and lime in their arenas (CaCO3). Farmers now employ a range of soil additives, including inorganic compound manures and carbon-based sources of nutrients, such as manure/compost, to enhance soil richness, which has resulted in an oversupply of primary macronutrients. Excess nutrients, especially nitrogen and phosphorus, may pollute the soil and groundwater when they are transferred from agricultural areas through surface runoff or leaching[2].

Soil is an important component that receives a significant amount of pollutants each year from a variety of sources. Soil, in general, serves as a natural barrier by controlling the movement of chemical components and chemicals into the atmosphere, as well as a sink for substance pollutants. Heavy metals are usually thought to be naturally occurring substances, although they are found in large amounts in certain ecological areas as a result of human activity. As a consequence, the environment's ability to replace lifecycles is damaged, posing a threat to human, animal, and plant health. This is due to the non-degradability of heavy metals, which promotes bioaccumulation in food chain. In a broad range of biological patterns, heavy metals may be found in both degraded and uncontaminated soil coverings. Because heavy metals cannot be tarnished or removed, they accumulate in soils, water, and residues. Heavy metals in soils may also be formed naturally as a result of human activity. Atmospheric emissions from volcanoes, movement of mainland soils, and weathering of metal-supplemented rocks are examples of natural bases[3].

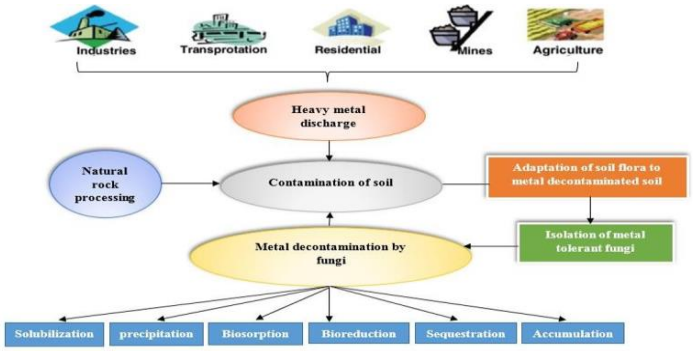

Figure 1: Representation of Heavy Metal Pollution Sources and the Approved Approaches for Metal Refinement.

Figure 1 represents Heavy Metal Pollution Sources and the Approved Approaches for Metal Refinement.Adulteration of agricultural and forestry soils with trace metals and metalloids has been a major source of worry throughout history. Metals in agricultural soils may enter food

chains, increasing human exposure and risk (both cancer-causing and noncarcinogenic hazards), while metals in woods are mainly a danger to porewater supplies, environmental risk, and woodland health. Metalloid and trace metal pollution in agricultural and forest soils has been a significant issue for decades. Due to rapid automation in emerging nations, the global world's excessive use of metals and manufactured chemicals, coupled with inadequate environmental management, resulted in widespread contamination. Heavy metal contamination in agricultural soils has sparked concern in recent years about the risk of direct consumption, bioaccumulation via the food chain, and ecological system effects to human health. Heavy metals such as copper, zinc, and manganese, as well as unneeded heavy metals such as cadmium, chromium, manganese, and lead, are the most hazardous to humans and marine life.

The presence of metallic elements in soils is a major issue since they accumulate in food chains, causing damage to the whole environment. Organic pollutants are biodegradable, but the presence of heavy metals in the atmosphere reduces the biodegradable frequency, thus doubling the emissions, i.e. organic pollutants and heavy metals. Heavy metals endanger people, animals, plants, and natural ecosystems in a number of ways. Variations in soil pH, penetrability, pigment, and usual interaction, as well as uninterrupted ingestion, plant adsorption, food-cycle, drinking contaminated marine, and changes in soil pH, penetrability, pigment, and usual interaction, all have an impact on soil value[4].

1.1 Heavy Metal Bases:

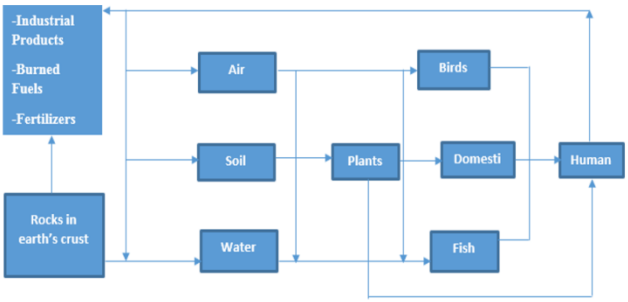

Figure 2: Representation of Metallic Element and Their Cycling In the Soil-Water-Air Organism Ecosystem.

Figure 2 represents Metallic Element and Their Cycling in the Soil-Water-Air Organism Ecosystem.

- **Natural Processes:**

Natural heavy metal emissions occur as a result of a variety of environmental factors. Such pollutants include volcanic eruptions, sea-salt sprigs, forest fires, rock cracking, biogenic source, and wind-borne soil particles. Metals may be released from their usual spheres and into various environmental sections as a result of natural weathering processes. Heavy metals include hydro-oxides, oxides, sulphides, sulphates, phosphates, and carbon-based compounds. Even though residues of the above-mentioned heavy metals have been discovered in humans and other animals, they continue to cause serious health issues[3].

- **Anthropogenic Processes (Anthropogenic Processes):**

Heavy metal anthropogenic activities have been shown to go beyond natural metal variations. Metals often detected in wind-blown dusts come from industrial locations. Smelting, which releases arsenic, copper, and insecticides, which releases arsenic; and the flickering of fossil energies, which releases nickel, mercury, and extra heavy metallic elements, are all significant anthropogenic bases that knowingly contribute to heavy metal adulteration in the atmosphere. Because of everyday production of products to meet the needs of the large population,

anthropological activities have been observed to pay greater attention to environmental pollution[4].

1.2 Mechanisms of Remediating Heavy Metals:

Acid mine water treatment techniques produce high density slush that is dissimilar, making disposal problematic due to a variety of metals, metalloids, and anionic constituents. As a consequence, current study has concentrated on chemical kinds found in Acid Mine Drainage (AMD) and subordinate slush. This helps to recover limited resources while also making sludge treatment and disposal simpler and safer, lowering environmental impact. Metal-laden waste is disposed of in landfills and leftover retention tarns, contaminating surface and subsurface water sources in the process. It may also indicate the presence of soil contamination, which decreases efficiency. Heavy metal clean-up methods should be given suitable and comprehensive attention in order to preserve humanoid well-being, floras, faunas, soil, and other habitat sections. The bulk of physical and chemical metallic element clean-up techniques need large amounts of sludge processing, destroy ecosystems, and are very expensive[5].

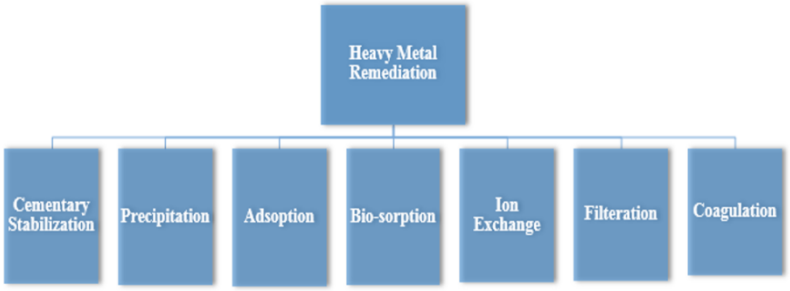

Figure 3: Representation of various methods to remove heavy metals from agricultural soil.

- **Precipitation:**

Various alkalescent chemical reactants have been employed to neutralize AMD (Acid-Mine-Drainage) throughout the years in order to increase the pH and, as a consequence, precipitate and recover the metals. The most common alkalescent reactants utilized for successive recovery of reserves resources from AMD and magnesium hydroxide (Mg(OH)2) are caustic potash (NaOH), clastic rock (CaCO3), burntlime (CaO), sodium carbonate (Na2CO3), and calcium hydroxide (Ca(OH)2)[6].

- **Adsorption:**

Because of its instability and elution capabilities, suraface assimilation is regarded the most efficient and economically viable option for eliminating metals from liquid blends. With highly concentrated solutions, surface assimilation is unsuccessful because the adsorptive rapidly becomes saturated with the adsorbate. It's only useful for very dilute mixes, it takes a long time to renew, and it doesn't discriminate between metals when it comes to attenuation[7].

- **Exchange of Ions:**

Between a solid substrate and a soil solution, this is often referred to as ion exchange. Clay and mastics with an increased atomic interchange potential are often used to approve alloys made from liquid blends. This method, however, is time intensive and only works for a limited number of metal concentrations in the combination. Heat and alkalinity affect this arrangement as well.

- **Biosorption:**

Biosorbents have many benefits, including accessibility, performance, and capacity. This is a basic and easy process. It's simple to regenerate, which makes it attractive. However, if the

feedstuff blend concentration is too high, the progression will rapidly outstretch, preventing advance impurity removal.

- **Membrane Technologies:**

When the water includes a significant concentration of pollutants, sheath equipment for acid mine drainage recovery is especially effective. Either assisted diffusion or reverse osmosis are used in this process. Some of the membranes used in mine water treatment filtration include ultrafiltration, nanofiltration, diffusion, microfiltration, and element percolation.

1.3 Challenges in The Phytomining Of Metallic Elements Polluted Soil:

Several biological, physical, and biochemical techniques have been employed to remove heavy metals from the soil during the last two centuries. These approaches, however, have significant drawbacks. They need a lot of time and effort, as well as a lot of disturbance in the native soil microbiota and constant changes in the physio-chemical characteristics of the soil. Phytoremediation technique is given unique attention amongst different perspectives to repair the heavy metal contaminated soil undisturbed. Phytomining is a method that uses natural or genetically engineered plants to remove dangerous chemicals from the environment, such as radioactive elements, fungicides, polychloroterphenyl and polynuclear pungent natural gas, and convert them to safe combinations. The emphasis of phytomining is divided into three layers: plant-centered element removal with monetary advantages, threat reduction, and maintainable soil oversight, in which phytoremediation gradually increases soil richness, allowing crop development to be tracked. High biomass fabrication and fast-budding plants, such as poplar, jatropha, and willow, are being used for the twin aim of energy generation and phytomining in the accumulation. Phytomining is a solar-powered, recyclable machine that has a good reputation in the community. In the near future, phytoextraction of metallic elements is expected to be a cost-effective equipment for agromining of metallic elements. Phytostabilization, phytoextraction, rhizofiltration, phytoevaporation, and rhizodegradation are some of the accepted equipment used in modern phytomining.

2. LITERATURE REVIEW

In established and underdeveloped agriculture, A N Ganeshamurthy et al. discuss the ecological danger of metallic element pollution in water, plants, and soil. Since the invention, the percentage of Indians living in towns and developed regions has increased to 27%. Despite restricted regulations and restrictions, underdeveloped agribusinesses are operated on a large scale in many developed regions throughout the globe. Non-degradable pollutants introduced into the system by human activities, such as metallic elements in soil, water, air, and crops, cause more concern since they have a tendency to bio-accumulate. Metallic element poisoning has wreaked havoc on humanity in the past, destabilizing intellect and causing embarrassing conduct. The body suffers from a shortage of important elements such as Cu, Zn, and others as a result of these pathogenic elements. With current level knowledge, a long-term and assured technique to block the entry of metallic elements into the food cycle is challenging. There are a number of options for reducing the outcome's concentration. Crop lands used in a different manner, which is indirectly eaten by people and animals, is a superior tonic for retaining element entrance into the food chain. There are many ecological regulations in India that regulate water, air, soil, and trash. Governmental foundations are built on the belief that a regulatory paradigm is sufficient. Regulatory mechanisms may not be in place in all instances, but they are essential derivators to complement other methods by putting a “cap” on the degree of deprivation that is informally acceptable, as well as allowing for alternative, cleaner, and appropriate replacements to be “feasible[8].”

Shalini Arora et al. discussed soil analysis and its potentially harmful impacts on human health. The study of the environment has been going on for a long time, and the molecular structure of naturally occurring topsoil has been changing through time in response to the ecological conditions of the environment. This percentage is the deciding element of soil richness because when the soil arrangement changes, the richness and quality of the soil degrades quickly. Long-term, low-level exposure to basic contaminants in the atmosphere often results in metallic poisoning. Exposure to hazardous metallic elements has been linked to a number of long-term illnesses and may result in a wide range of health problems. Urban soil receives various contributions of metallic elements from a variety of moving and stationary sources, such as vehicular traffic, power generation facilities, waste incineration, and resuspension of surrounding polluted top soil, and thus plays a significant role in contamination in developed areas. Because roadside topsoil is more polluted than any other location, such as grounds or a farm home, the percentage of the composition of the top soil varies in various regions of the atmosphere. Due to significant growth in automobiles and industry, these differences are particularly noticeable in Indian metro areas. As a result, urbanized top soil study is important for determining the source, circulation, and metallic pollution in developed regions[9].Ahmad E et al. discussed Importance of Free-Living Fungi in Heavy Metal Remediation in which they discussed how Heavy metal pollution is one of the world's most serious environmental issues, presenting serious threats to agro-ecosystems. Historically, heavy-metal cleanup methods have been both costly and inconvenient. This book offers thorough, up-to-date coverage of natural, sustainable alternatives to heavy metal removal/detoxification that utilize a broad variety of biological components, resulting in improved crop yields in these soils. Based on a thorough knowledge of metal pollution and the roles of plants and microorganisms in the management of hazardous soils, novel, ecologically friendly, and low-cost solutions are given. The book, written by international specialists, not only offers the essential scientific foundation, but also tackles the difficult issues that must be addressed in order to better comprehend metal toxicity in soils and its treatment via bioremediation[10].

3. DISCUSSION

There is a complicated connection between environmental chemical composition of natural resources and emissions, according to their independent study. Ferrosol sewage sludge is the source of heavy metal's environmental impact.The impacts of heavy metal emissions from different sources on topsoil and flowing water in various regions of the globe, as well as their dominance of pollution or metallic residues. Heavy metals such as chromium, manganese, copper, mercury, and zinc pollute soil, posing serious environmental problems since they are non-essential and detrimental to flora and wildlife, as well as having a direct hazardous effect on human health. Anthropogenic activities such as mining, industrial development, and agronomic practices such as the use of pesticides, fungicides, and composts have lately discharged heavy metals into the topsoil, water, and atmosphere. Through a number of physiological processes, these metallic elements are released into the plant system, affecting plant growth. The absorption of metallic elements into the environment varies according to a variety of factors, and it becomes hazardous when it exceeds acceptable limits. The possible genesis of these components has led to an increasing presence of metallic elements in the environment, whether via direct absorption from contaminated soil, depletion of fully-fledged crops on polluted soils, or drinking waste-water that has infiltrated through these soils. The goal of this study was to look at how heavy metals affect agriculture and how they affect human health, as well as to propose some ways for removing heavy metals from crops and soil. Heavy metal buildup occurs only when vegetal crops are cultivated in a contaminated region with metallic elements, and these metallic elements subsequently enter the food chain. When people consume a metallic element-contaminated root vegetable, they develop a range of severe health issues. These heavy metals have an impact on

soil nutrient status, soil strength, water supplies, and extramarine living organisms, in addition to plants and people.

4. CONCLUSION

By producing different types of garbage and dumping them without proper management, modern lifestyles and industrialization have created countless environmental problems. These trashes contaminate the environment, causing the most critical and fatal impacts on living creatures, jeopardizing their survival. The most hazardous feature of industrial wastes and other trashes is the discharge and buildup of metals, particularly heavy metals. Metallic element contamination of agricultural soils as a result of growth and industrial development is of great concern due to the potential health risk caused by consuming contaminated crops. Vegetables are an important component of the human diet because they provide vital nutrients for optimum health. As a consequence of frequent applications of fertilizers and pesticides, heavy metals have accumulated in plants. The toxicity of heavy metals ingested via contaminated vegetables is a major issue.

However, just a few researches have been conducted to establish the permissible limits of heavy metal music. As a result, it is recommended that trash be processed before being thrown in the environment in order to reduce the sound impacts on the atmosphere by converting them into less hazardous forms. Effective treatments are too costly. The most efficient and cost-effective approach in this respect has been determined to be bioremediation, which entails the use of living organisms to address certain pollution-causing circumstances via effective absorption of pollutants from the desired environment. It has been discovered that phyto-remediation, or the employment of plants to clean up trash, is extremely successful. In addition, a new research on heavy metal exposure in babies, the elderly, and women, especially pregnant women, is required. In addition, strategy and policy are needed to monitor the limits of accretion in vegetables and hyperactive accumulators specified for certain plants.

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PURSUING FIFTH GENERATION TECHNOLOGYIN MOBILE COMMUNICATION

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ABSTRACT

This article covers the main initiatives for wireless fifth Generation networks. The program and project efforts as well as the newest publications are emphasized. A closer investigation is being conducted at a broad range of projects connected with Fifth Generation in the EU. Recent thematic IEEE Communications Magazine Fifth Generation issues, as well as related White Papers from other sources, are limited to literature review. The aim is to explain what Fifth Generation means: what the main issues are and how to address the essential components of the fundamental fifth Generation system concept. The references examined indicate that Fifth Generation needs to provide low latency, extremely reliable communications and wide connection in addition to capacity boosting technologies. The most challenging element in Fifth Generation development will therefore be the creation of a sufficiently flexible system concept platform for effectively integrating and controlling numerous distinct technologies that are suited for diverse applications.

KEYWORDS:*Fifth Generation, Access, Networks, Project, Radio, Spectrum, Technology, Wireless.*

INTRODUCTION

Capacity demand for presently deployed Third Generation and Fourth Generation wireless technologies has been driven by growing internet traffic. Intensive research is currently underway on many fronts towards 5th generation wireless communication networks. In this study, a broad range of European research projects, current literature and Fifth Generation white papers from key players in wireless technology are analyzed to scratch the surfaces of various

Fifth Generation activities. The aim is to help you understand what Fifth Generation is and how different Fifth Generation initiatives are designed to accomplish this[1].

There is currently no one Fifth Generation definition. But the notion that Fifth Generation is simply a mix of various methods, scenarios and case usage rather than a new single technology of broadcasting access is widely accepted. The following lists as technical requirements for current technology (Fourth Generation)[2]:

- thousand times higher mobile data volume per area
- ten to hundred times higher typical user data rate
- ten to hundred times higher number of connected devices
- ten times longer battery life for low power devices
- five times reduced end-to-end latency

The 5th generation Non-Orthogonal Signaling Waveforms project provides a scalable, efficient air interface that gives up the strict constraints of orthogonality and synchronization enforced by previous generation networks. UFMC, Filter Bank, and Generalized Frequency Division Multiplexing are some of the most promising examples of orthogonal frequency division multiplexing in a Fifth Generation context. It covers aspects such as a single frame structure, filters, sparse signal processing, robustness and very low latency transmission, in addition to the multicarrier waveform design itself[3].

Enhanced Multicarrier Technology for Professional Ad-hoc and Cell-Based Communications project provides the channel estimation, equalization, and synchronization capabilities needed for a highly flexible and efficient filter-bank processing. In addition, the viability of multi-carrier filter bank-based methods such as relays, multi-hops, cooperative systems in certain settings where synchronization is difficult to maintain is assessed[4].

Fig. 1: The Launch of Commercial 5G in India Has the Potential to Increase the Median Download Speed By Up To 10 Times Compared To the Download Speeds Offered Currently By Fourth Generation- Long Term Evolution (LTE) Networks.

Physical Layer Wireless Security project aims to enhance privacy via security and secrecy coding in physical layer on wireless networks. Confidential radio waveforms and access methods in real experimental Wi-Fi settings and LTE simulation scenarios are created and assessed[5].

Full-Duplex Radios for Local Access idea relies on radio transceiver technology that simultaneously utilizes the same frequency as the carrier for transmission and reception. This new paradigm of transmission may enhance connection significantly and provide new methods of flexible spectrum use and networking.

Connectivity management for Energy Optimized Wireless Dense networks project aims at extremely dense heterogeneous wireless/wired backhaul integrated access networks. The goals are to provide density-related capacity when required, to optimize MAC mechanisms for various settings, to enable traffic-proportionate energy consumption and to guarantee user experience via intelligent connection management systems.

Dense Cooperative Wireless Cloud Network in the solution of wireless communications issues in highly interfering ad hoc networks, Project utilizes the paradigm virtual relay-based wireless cloud that offers a simple and unambiguous interface to the terminals.

Interworking Design of an Open Access and Backhaul Network Architecture for Small Cells based on Cloud Networks project will use a centralized Radio Access Network paradigm with a cloud infrastructure based open IT platform. Access and backhaul is designed and improved in combination.

Responses to the following questions are requested by Distributed Computing, Storage and Resourcing for Collaborative Femtocells project: What kind of communications/computing technologies are required to converge total women's network and cloud computing infrastructure?

How much can the proposed femto-cloud methods improve the spectral/energy/service efficiency? Femtocell-based wireless technologies for isolated rural communities in developing countries use the new wireless access (Third Generation or Fourth Generation femtocells) and heterogeneous outdoor backhaul technologies for the development of cost-effective and technologically sustainable rural environments, using the long-distance WiFi, WiMAX and VSAT.

A large-scale integration-based industry led effort is beyond 2020 Heterogeneous wireless networks with Millimeter-Wave Small Cell Access and Backhauling. It investigates and demonstrates key technologies and characteristics to enable the integration of future heterogeneous networks of millimeter waves of small cells. In particular, the project is interested in networking features and algorithms as well as integrated radio and antenna technologies.

Advanced Dynamic spectrum Fifth Generation mobile networks Employing Licensed shared access. The study subject under the licensed shared access paradigm is explored in the project's primary aim:

- guaranteeing quality of services for customers of all participating networks of spectrum sharing
- reducing overall energy consumption of lens networks
- dynamic, optimum allocation of spectral and power resources at timeframe from seconds to even milliseconds

Spectrum Overlay via aggregation of heterogeneous Dispersed bands the main aim of the research is to efficiently integrate heterogeneous and heterogeneous Radio Access Technologies non-continuous scattered spectrum bands to offer a new overlay technique.

Cognitive Radio Standardization effort Coordination activities coordinate and support existing and future FP7 projects. Coordination activities they adopt a targeted approach and plan for standardization to exploit their cognitive radio and dynamic spectrum discoveries.

Cognitive Radio for Satellite Communications project researches develops and proves the suitable cognitive radio techniques in satellite networks, including dynamic spectrum sharing. The goal is to show that their future disadvantage will surpass new economic possibilities and benefits of flexible spectrum usage.

Self-Management for Unified Heterogeneous Radio Access Networks objectives of the project are to create multi-radio access technology, including SON functionalities and the creation of an integrated SON management system.

Massive MIMO for Efficient Transmission aim of the project is to move MIMO from a highly promising theoretical concept to a practical level utilizing new low-cost yet flexible technologies.

High capacity network Architecture with Remote radio heads & parasitic antenna arrays Project aims to provide multi-antenna distributed wireless access by combining radio remote heads technology with EPAR technology. This would geographically expand radio over fiber connections via wide area dispersed access over radio over fiber, providing a multi antenna-like single active RF-chain characteristic[6].

Mobile Cloud Networking Project provides on-demand cloud-based mobile elastic networks. The emphasis is on developing package systems and on the management of their lifecycles.

Mobile networking is intended to solve Fifth Generation problems with the development of new technologies for the offloading of terminals via the use of a range of download methods, e.g. WiFi cellular connections. Offloading IP traffic controlled by the network is also mentioned.

European Cooperation in Science and Technology activity on Cooperative Radio Communications for Green Smart Environments, scientific scope of radio communication systems and networks and intelligent environments is energy efficient, as the name suggests.

Network of Excellence in Wireless Communications emphasis of the project is on interdisciplinary and long-term research. The ultimate limits of communications networks, energy and spectrum efficient communications and networking, as well as opportunity and cooperative communications, are examples of research goals. It also promotes academic-industrial co-operation and training of new researchers, for example, by organizing summer courses.

Software-Defined Access utilizing Low-Energy Subsystems project aims to create a new 10 Gbps fixed access service that provides transparent transport services for both fixed and mobile clients and a low-cost wireless access connector service. The convergent network architecture includes improved management and control plans with open access and multi-operator capabilities.

Links-on-the-fly Technology for Robust, Efficient and Smart Communication in Unpredictable Environments The project examines varied and dense future networks as a viable foundation for a loss-based network design for communication connections. RESCUE has been at the forefront of public safety and automobile applications.

Aerial Base Stations with Opportunistic Links for Unexpected & Temporary Events project focuses on future public safety communication systems. The suggested heterogeneous network design is based on the following elements:

- low altitude aerial LTE-A base stations
- portable land mobile LTE-A base stations
- advanced multimode LTE-A professional terminals

Low EMF Exposure Future Networks project has a very realistic goal of finding feasible methods to reduce public electromagnetic field exposure by at least 50 percent without compromising service quality.

LITERATURE REVIEW

J. G. Andrews et al. stated in the paper that what would Fifth Generation be? What it will not be is an incremental improvement on 4G. The past four generations of cellular technology have each been a significant paradigm change that has destroyed backward compatibility. Indeed, Fifth Generation will need to be a paradigm change that incorporates extremely high carrier frequencies with enormous bandwidths, extraordinary base station and device densities, and unprecedented numbers of antennas. However, unlike the previous four generations, it will also be highly integrative: connecting any new Fifth Generation air interface and spectrum together with LTE and WiFi to offer global high-rate coverage and a seamless user experience. To enable this, the core network will also have to achieve new levels of flexibility and intelligence, spectrum control will need to be rethought and enhanced, and energy and cost savings will become even more important concerns. This article addresses all of these issues, highlighting important difficulties for future research and preliminary Fifth Generation standardization efforts, while giving a thorough review of the existing literature, and in particular of the papers featured in this special issue[7].

I. Chih-Lin et al. stated in the paper that in the face of the exponential growth of mobile Internet, engineers across the globe are searching for wireless solutions for the next generation to meet the anticipated needs of the 2020 age. Our viewpoint on Fifth Generation technology is given in this article with two key topics, green and soft. The Shannon theorem and conventional cell-centered design may be rethought to significantly increase network capacity while decreasing network power consumption. In five linked areas of research the potential of green and soft combining is investigated: energy efficiency and spectral co-design, no more cells, replenishment / control, invisible base stations, and full duplex radio[8].F. Boccardi et al. stated in the paper that the design of future fifth (Fifth Generation) cellular networks will be modified in the wake of additional study. This study presented 5 technologies that could lead to disruptive architectural and component change: device-centered designs, millimeter wave, large MIMOs, smart devices, and machine-to-machine support. The fundamental concepts of each technology and their possible effect on Fifth Generation and the remaining research difficulties are explained[9].

N. Bhushan et al. stated in the paper that this study looks at network density as the key mechanism for the next decade for wireless growth. Network densification comprises area densification and frequency densification using greater parts of radio spectrum in different bands. The self-organizing networks and intercellular interference management enable wide-ranging cost-effective spatial densification. Full benefits of densification can only be realized if they are backed by backhaul and advanced receivers that are able to remove interferences[10].

DISCUSSION

In this part you will mainly examine the 7th FP7 Future Networks Cluster Radio Access and Spectrum Projects, which handle most of the research activities of the European 5-G Group. Horizon 2020 and Fifth Generation Public Private Infrastructure Partnerships coordinate new research initiatives and activities.

The Twenty-Twenty Information Society facilitator is the biggest Fifth Generation FP7 project (29 partners) with the goal of establishing the foundation for Fifth Generation systems and serving as a consensus builder towards standardization. It has developed several test cases and scenarios to highlight and solve the major issues Fifth Generation will encounter (see Fig. 2). The possibilities are given as:

- Amazingly quick
- Great service in a crowd
- Best experience follows you

- Super real-time and stable connections
- Ubiquitous objects communicating

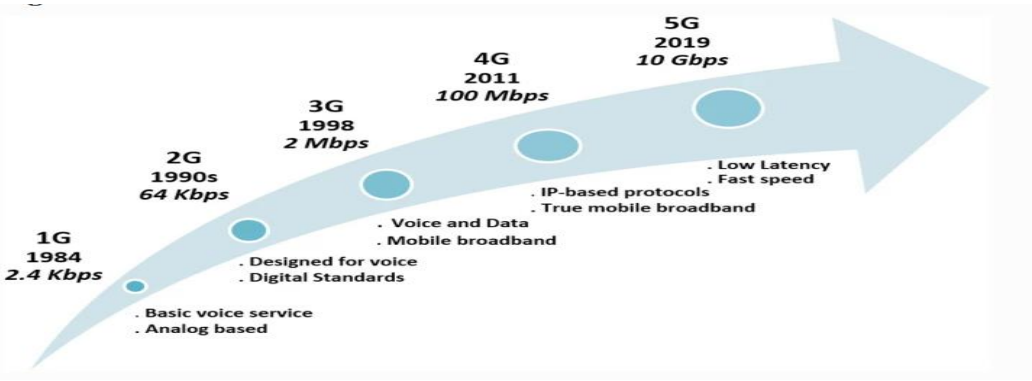

Fig. 2: Development of Service Types over Wireless Mobile Generations.

The first one is centered on the extremely high latency of data rates that is instantaneous connection. In the second scenario sufficient user experience should be provided in highly crowded venues such as shopping malls, stadiums and rock concerts. The third scenario focuses on user mobility with high service experience again, for example vehicle communications. New case/applications with high reliability and latency requirements are added in the fourth scenario. The current situation is about handling a large number of devices effectively e.g., machines, sensors.

It has also defined so-called horizontal themes to be combined with technological components to create the overall system idea. These are:

- Direct device-to-device connection
- Massive machine communication
- Moving networks
- Ultra-dense networks
- Ultra-reliable communication

Finally, an architectural framework is in place to combine various centralized and decentralized methods with a cohesive concept.

CONCLUSION

This article provides an overview of different Fifth Generation projects globally and particularly in Europe. Key publications, projects and events with a focus on Fifth Generation technology are given special attention. The research shows growing common components yet the Fifth Generation concept stays intact. Performance gains are mainly expected by combining network density, an increase in spectrum and better wireless communications technologies, increased carrier aggregations, and spectrum sharing beyond 6 GHz frequencies. The proportion of network connections and traffic will grow in the type of computers for communication. The combination of mobility and highly reliable communications really calls for novel solutions under difficult propagation conditions due of tight technological limitations. Network Virtualization will also play a significant role for Fifth Generation, in especially in the form of Cloud RAN development. Cases, scenarios, and allocations for spectrums are all so varied that the integration of the whole Fifth Generation system concept needs the greatest agility, scalability, and re-configurability.

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THE BRIEF REVIEW ON THE AUTOMATIC LOAD REGULATOR

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ABSTRACT

More inventive and imaginative concepts are required as a result of advancements in wireless technology and the automation sectors. This has aided in the monitoring and control of equipment from afar. A wireless system for home automation has been proposed as part of a system that monitors and controls devices and loads remotely. The proposed plan is cost-effective. With the aid of such automated systems, a network has been created that connects peripheral equipment, smart chip bearing appliances, and many other subsystems. As a result, real-time remote control of power operation is possible. To guide the devices according to the demand and need, these systems will require radio link connection or wired communication. Radio link communication, like cable communication, has certain drawbacks, such as range restrictions, reduced data rates, greater costs, software configuration, and wire deployment.

KEYWORDS:*Mobile, Control, Automation, Global System for mobile communication, Wireless Network, Interactive Voice Response System, Short Messaging Service.*

1. INTRODUCTION

Bangladesh's AC power supply, provided by the Power Development Board (PDB), varies from time to time. Furthermore, in rural regions, supply voltage is often lower than stated. This presents a significant danger to high-tech electrical gadgets. As a result, numerous critical electric machines or equipment may be destroyed. Power quality issues, such as voltage sags, surges, and brownouts, have a significant detrimental effect on industrial output[1]. This seems to be true for both developed and developing countries. As a result, maintaining an acceptable pre-specified input voltage has become a requirement in both rural and urban regions. We'll need to utilize the Automatic Voltage Regulator to preserve them. An AVR is an electrical device that controls the fluctuation of input voltage to a load at a predetermined level. The voltage of the main power supply may be influenced by a variety of troublesome physical variables, necessitating the use of specific regulating equipment to maintain the voltage stable. Programmable AVR is a better alternative to AVR since it is more versatile, easier to change, and has the best accuracy and hysteresis.

Wireless technology is a crucial and determining element for effective operation in the automation sector. With the advancement of technology and the advent of network-based automation systems, it is now feasible to remotely monitor and operate equipment. Various technologies such as Bluetooth, DTMF, and ZigBee may be utilized to do this. These automated systems have grown quickly and have a large potential for expansion, and they will aid in the appropriate organization of gadgets and appliances for ease of use. With the aid of such automated systems, a network has been created that connects peripheral equipment, smart chip bearing appliances, and many other subsystems.As a result, real-time remote control of power operation is possible. To guide the devices according to the demand and need, these systems will require radio link connection or wired communication. Radio link communication, like cable communication, has certain drawbacks, such as range restrictions, reduced data rates, greater costs, software configuration, and wire deployment. As a result, a GSM-based system with IVRS integration has allowed users to manage and monitor appliances and loads remotely. GSM-based home automation systems have been created and deployed, using GSM-based cellular networks that have previously been established and implemented.

The GSM-based mobile phone may be utilized as a commanding device, eliminating the need for a transceiver. As a result, apart from the user instructions, no further equipment is required. The GSM network uses radio waves to communicate and is capable of sending information in real time for remote monitoring and control of devices. For simplicity of use, the IVRS allows the user to interact. Because mobile networks have bigger networks and greater coverage than local area networks, it is simpler for users to arrange the system using portable phones. The different components of the proposed system are shown in figure 1 as a block diagram[2]. A set of instructions to switch on and off the necessary devices is already programmed into the microcontroller. A symbol or a combination of symbols has already been assigned to a command in the keypad. To operate any device, a call must be made to the consumer's SIM number, after which the interactive voice response system will send the user a pre-recorded voice. Consider the following scenario: To turn on the load, press 1, and to turn it off, press 2. The user will choose an option using the control unit based on the need, which will then be transmitted to the appliance control unit through the worldwide system for mobile communication. All of these instructions are encoded in dual tone multiple frequency before being transmitted to a frequency decoder [3]. The MCU's role here is to carry out these instructions before passing them on to the relay's circuitry, which will carry out the required action. Thus, by completing all of these procedures, the gadget or appliance will be switched on or off, and the user will receive appropriate messages through GSM technology. The units in the block diagram are described in depth, such as the GSM module:

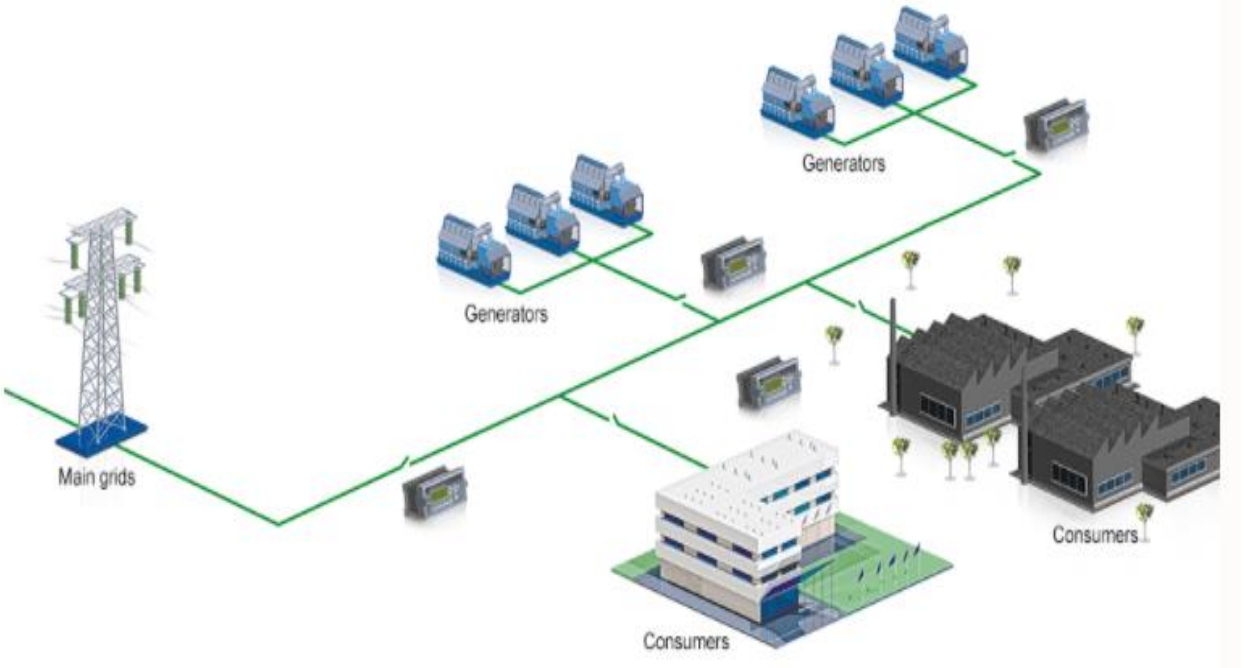

Fig. 1: Diagram Used to Show Wirelessly Load Sharing

The delay generated throughout in the execution of a command involving single control is given. The equation for calculating the complete latency of the system implemented is given[4].

While the nature of the high complexity and nonlinearity of power systems varies, power control system engineers confront difficulties together. In order to achieve excellent quality, modern generator controllers have been established in a variety of studies and have been published in many publications. Traditionally, linear control theory is used to construct excitation controllers.

AVR is the most common conventional excitation controller. Power AVR systems have been created in a number of forms to reflect the many kinds of utilized. Automatic voltage regulators (AVRs) are not conventional, and they are utilized on a wide scale with a modern design and linear transfer machine operations. However, all of the components of a modern generator, such as the governor and exciter systems, are nonlinear. As a result, a control system is only valid for a limited number of periods. The AVR system is unable to react adequately throughout the full spectrum of working circumstances due to its linearized model-based design, Benefits, and good outcomes. Negative results from a linearized AVR model are possible

Damping has a negative impact on the situation's stability. Many research have been conducted to create a quicker and more accurate reaction to work circumstances that may lead to uncertainties, as well as adaptive self-tuning of AVRs to act as a controller as shown in the Figure 2.Negative results from a linearized AVR model are possible. Damping has a negative impact on the situation's stability. Many research have been conducted to create a quicker and more accurate reaction to work circumstances that may lead to uncertainties, as well as adaptive self-tuning of AVRs to act as a controller. Negative results from a linearized AVR model are possible. Damping has a negative impact on the situation's stability. As a result, in order to have a quick controller, numerous studies and responses to work circumstances may lead to more precise and adaptable uncertainties own.

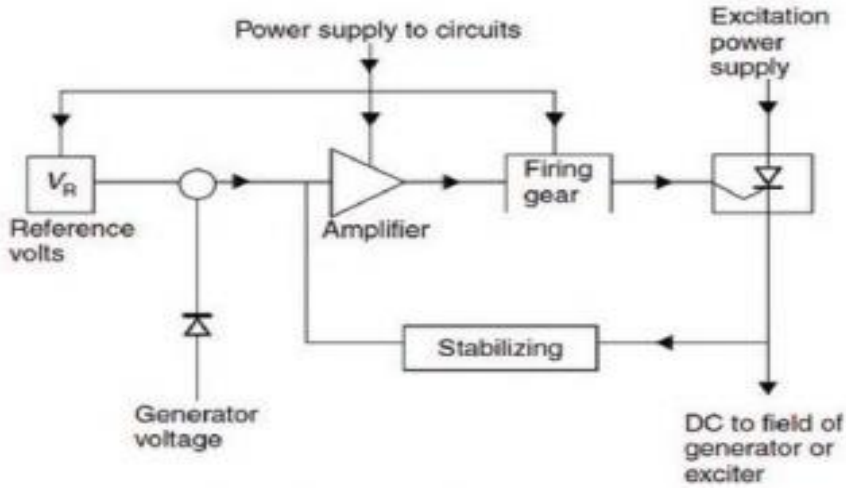

Figure 2: AVR to Act as a Controller

The AVR's primary function is to ensure that the distribution system is sufficient during voltage constant monitoring, there is a lot of reactive power. Improvements to the parallel work machine's stability. Upanna A machine's speed excitation system assists in maintaining the voltage control reactive power flow and the rate of the machine. Terminal. Increases the terminal voltage of a machine's speed.On the contrary, as R upanna points out, reactive power consumption is increasing. A sensor detects the change in terminal voltage. Transformer's potential (PT). Fix by utilizing an AC output with a set voltage. A Dc is used to connect the sensor and the proper product separator. Signal strength as a reference a device for controlling excitation to reestablish the voltage signal and the main course in an upanna. The exciter is the lack of a nominal terminal.

The GSM sim300 module is utilized, and it may be used for SMS alerts, remote control, and sensor monitoring, among other things. The model communicates with the controlling unit through an RS232 interface. This device has two functions. The first step is to create a suitable connection between the user and the ACU through the network's radio link. Another option is to provide information about the device's ON or OFF state. When the GSM module receives a call, the system's purpose is to check the user's password authentication, and only the authorized user is connected through GSM. The user will next get the necessary voice messages, which will include the set of instructions that he or she must follow through the GSM network. The commands chosen by the user are then transferred to the DTMF decoder, which performs a control action based on the instructions provided by the user [2].

If a change to the parameter is needed, the main control unit will be stopped to update the status of the user's change. If the change is made over the phone, the data is sent through the RS232 interface. Because the GSM module does not save any commands, each command is regarded as urgent and action is performed immediately. Transmitting and receiving module: If there are several ACUs, a transceiver module is used to send and receive data between them, assisting in the execution and termination of existing orders. A CC1000 UART module, which is an ultra-high frequency transceiver for lower voltages and lower power, is utilized for this purpose. The DEIF power management solutions include the ALC Automatic Load Controller. It may be essential to manage the system load if the generator is driven while the mains grid is unavailable. When the ALC is installed in a system section, it will be able to regulate up to eight consumer feeder breakers [5].

One system can hold up to 8 ALC units, giving the possibility to control up to 64 feeder breakers. For each feeder breaker, the control can be based on a fixed power consumption value for the consumers connected to the feeder, or it can be based on a power measurement feeding a

4-20 mA signal into the ALC units[6].The ALCs may automatically connect and disconnect customers in a predetermined sequence based on the power calculation in the system. This implies that if a generator is tripped for whatever reason, the system will calculate the power flow and disconnect the required number of consumer feeds to avoid the plant from being overloaded. If a generator is removed and then reinstalled, the system will determine if the generator is required to supply the system. If this is the case, the generator will be started, and the consumer feeds will be connected once it is online [7].

LITERATURE REVIEW

The authors AfshanMulla, JaypalBaviskary, JeetDesaiz, ChandrashekharBeralx, and AnaghaJadhav developed a system that combined GSM and IVRS technologies for the aim of remotely monitoring and managing equipment. A GSM-based system eliminates the requirement for a transceiver [1]. The authors, Carelin Felix and I. Jacob Raglend, reviewed the current home automation system as well as the barriers to adoption of these technologies. Furthermore, using Zigbeetechnology, a new architecture has been suggested and executed. Authors Seong Phil Hong, JaypalBaviskar, AfshanMulla, AmolBaviskar, and Jeet Desai have developed how it uses a DTMF-based system to read the remote control of different devices and supports parallel connections. By integrating the DTMF concept, a secure method for managing loads and devices has been provided [8]. Mohammad MurshadulHoqu studies the development and implementation of a Programmable Automatic Voltage Regulator (PAVR) with improved accuracy, hysteresis, and anomaly protection. Locally available systems are imprecise and suffer from oscillation between two output voltages, resulting in a surge at the output that may destroy expensive equipment. While the load varies, power voltage stability, output wave rate reduction, and unchanging power-voltage to the instruments are required to prevent these. This necessitates the maintenance of a steady voltage as well as quick response to changes in input voltage and load. This paper defines the flaws and introduces a new system in the tolerable to control the entire system automatically using a microcontroller and some protection devices to detect faults, and the circuit implementation in this system is simpler and more flexible than traditional analog control circuitry. To improve performance, a simulation of both the circuit and the software was completed[9].

PriyankaMadanraoPatil studies for today's world, a power system is essential. Infrastructure that is managed using a variety of techniques and It is essential to understand a system in order to effectively manage it.different factors and the roles they play The goal is to The goal of this project is to increase stability through using electricity. Automated voltage regulator, and system stabilizer Governor. It is essential to accomplish in the power system. Various gadgets have excellent stability and control. As a result, AVR is widely utilized. However, AVR should be considered. To overcome slowness, use any suitable controller in combination with it. Due to the disruption, a response will be provided that is efficient. Stability. The AVR controller is used in power generation systems. For regulating the voltage of electricity, PID is essential. Owing to a change in demand on the generating system Voltage the primary cause of fluctuation is variations in the load, especially if If the voltage fluctuates, the device may be damaged. As a result, AVR is required to maintain voltage stability.is employed by the system. The systems that have been modeled include the following: PID controller, amplifier, exciter, sensor, and stabilizer The AVR system simulation results using MATLAB are as follows: presented[10].

DISCUSSION

This paper discusses about the Wireless technology is a critical and deciding factor in the automation industry's success. It is now possible to remotely monitor and control equipment thanks to technological advancements and the introduction of network-based automation systems. This may be accomplished using a variety of technologies such as Bluetooth, DTMF,

and ZigBee. These automated systems have rapidly developed and have a lot of room for growth, and they will help with the proper arrangement of devices and appliances for convenience of use. A network has been established with the help of such automated systems, which links peripheral equipment, smart chip bearing appliances, and a variety of other subsystems**.**The microcontroller has already been configured with instructions for turning on and off the required devices. In the keypad, a symbol or a combination of symbols has already been allocated to a command. A call to the consumer's SIM number is required to operate any gadget, after which the interactive voice response system will send the user a pre-recorded voice. Consider the situation below: Press 1 to turn on the load, and 2 to turn it off. The user will utilize the control unit to choose an option depending on their needs, which will then be sent to the appliance control unit through the global mobile communication system. Before being sent to a frequency decoder, all of these instructions are encoded in dual tone multiple frequency**.**

Based on the system's power calculation, the ALCs may automatically connect and disconnect consumers in a predefined order. This means that if a generator is tripped for whatever reason, the system will calculate the power flow and disconnect the necessary number of consumer feeds to prevent overloading the plant. The system will detect whether a generator is needed to feed the system if it is removed and then reinstalled. If this is the case, the generator will be started, and after it is operational, the consumer feeds will be linked.Damping has a detrimental effect on the stability of the situation. Many studies have been carried out to develop a faster and more accurate response to work situations that may cause uncertainty, as well as adaptive self-tuning of AVRs to serve as a controller.A linearized AVR model may provide negative outcomes. Damping has a detrimental effect on the stability of the situation. Many studies have been carried out to develop a faster and more accurate response to work situations that may cause uncertainty, as well as adaptive self-tuning of AVRs to serve as a controller. A linearized AVR model may provide negative outcomes. Damping has a detrimental effect on the stability of the situation. As a consequence, many research and reactions to work conditions may lead to more precise and adaptive uncertainties own in order to have a fast controller.

CONCLUSION

The suggested system makes use of cutting-edge technology to assist users in managing and operating different appliances and gadgets in real time and from a distance. It may be seen as a significant answer to issues that emerge when the person or owner of the home is far away and unable to monitor or manage the gadgets and appliances in real time. In this article, a suitable design and implementation of a home automation system based on GSM technology is presented. The use of developing technologies such as Interactive voice response systems, in which the user may give instructions through voice messages, has been suggested and explored. Also computed and analyzed is the delay produced in the system as a result of execution and operation. The work that can be done in the future is to create new technologies and equipment that can decrease the latency generated in the entire operation. As a result, the IVRS system assists the user in remotely monitoring and managing loads and devices. A total of n bits are taken into account while putting down the equations. The total delay caused by all GSM calls adds up to an average of four seconds. The propagation latency varies depending on the distance between users, cell size, and BTS. The propagation delay is approximately 0.1milisecond for a cell size of thirty kilometers. Due to processing time, an additional 0.3-0.6 millisecond delay is imposed. Because the incoming signal is transmitted to all users, there is a rest delay. The user will also take their time entering their login and password, causing considerable delay. It will take some time to execute instructions and programs delivered to the memory. As a result, the initial control action has a delay of approximately 6-10 seconds.

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THE ROLE AND IMPORTANCE OF PHYSICAL TRAINING AND SPORTS EXERCISES IN THE HEALTH OF A DEVELOPED GENERATION

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ABSTRACT

In this article, the culture of the state and society in the field of sports is to accelerate the development of physical and mental health of these segments of the population, which is of paramount importance to increase physical activity, physical culture and sports. forms vitality is shown to form feelings of patriotism and patriotism.

KEYWORDS: *Physical Education And Sports, Health Promotion, Physical Education, Physical Culture, Training, Physical Education Classes.*

INTRODUCTION

Extensive work has been done to develop a sense of patriotism, the selection of talented athletes and the systematic organization of targeted training.During the years of independence, our country has created modern conditions for the population, especially the younger generation, to regularly engage in physical culture and mass sports.

Through sports competitions, young people are developing confidence in their will, strength and abilities, courage and patriotism, famous athletes who are raising the flag of our Motherland.Most importantly, these competitions have become a means of introducing our youth to sports and a healthy lifestyle [1-4].

At the same time, today the coverage of all segments of the population with physical culture and mass sports, the active promotion of physical culture and mass sports in all regions of the country is one of the main conditions for physical and mental health and maturity. Issues such as training, creating the necessary conditions for young people to realize their abilities and talents, the selection of special talents in the field of sports and improving the system of targeted training are waiting for a systematic solution [5-11].

The material and technical base of several sports facilities does not meet modern requirements, the level of effective use of sports facilities remains low. Active movement, especially physical activity, is one of the most important factors in the development and formation of a person.It is known from the experience and observations of several scientists that optimal movement allows children to develop physically and increase their abilities.If physical activity is excessive, the

benefits of exercise are reduced and the body is negatively affected, while excessive mobility has a severe effect on young exercisers.

THE MAIN PART

The next generation is the wealth of the state. If the family is healthy and strong, there will be peace and harmony in the community. Therefore, peace and stability will prevail in the country only if the community is strong. After all, family well-being is the basis of national well-being. For many years, mankind has taken a creative and practical approach to the issue of the healthy upbringing of the younger generation

Emphasizing that physical education and sports are an integral part of the process of strengthening health, as well as the harmonious development of the younger generation, they highlighted the role of physical education and sports in educating a harmoniously developed generation. Research on the development of a healthy generation shows that the impact of physical education and sports on the formation of the child's body is invaluable. The human body regularly experiences a biological need for action [12-19].

The introduction of the position of "Athlete" in the staff of the Republican schools of higher sports and children and youth sports is an important step towards further strengthening the system of financial support for members of the national teams of Uzbekistan. The program also includes children's and youth sports specializing in sports in order to systematically organize and manage the activities of after-school sports clubs and sports clubs for schoolchildren and students in sports facilities of all educational institutions. It is planned to introduce the position of "Sports Club and Selection Coach" in schools and children's and youth sports schools. With the introduction of this position, in addition to sports clubs organized in educational institutions, thousands of pupils and students will be covered and opportunities will be created for them to go in for sports on a regular basis. In addition, the program provides for the introduction of a rating system for the activities of educational institutions and sports clubs specializing in physical culture and sports in the Olympic, national and other sports. The establishment of the badge "Excellence in Physical Culture and Sports" will serve to further encourage the work of volunteers in the field. According to the program, the three-stage program of sports games "Umid Nihollari", "Barkamol Avlod" and the Universiade will be held among schoolchildren and students. radical improvement of the system of appropriate incentives. Transparency in the selection and admission of talented athletes from among young people, the organization of the Republican and regional councils for the systematic organization and control of their targeted training, the selection and admission of talented athletes to educational institutions and sports clubs specializing in physical culture and sports and there is no doubt that the implementation of measures to ensure objectivity will ultimately serve to increase the share of achievements of our athletes in international competitions [20-23]. By further strengthening the role of physical culture and mass sports in the life of our society, the formation of a healthy lifestyle among all segments of the population, creating all conditions for young people to realize their abilities and talents. Familiarity with the way of life, as well as the expansion of the ranks of our famous athletes, who raise the flag of our country in prestigious international arenas. These actions serve as an active biological stimulus to physical maturity and intellectual development. The period of intensive growth and development of the organism coincides with the period of childhood and adolescence. Observing the passive state of the growth process in the child's body leads to the fact that during adolescence, there are signs of disease in the musculoskeletal system and internal organs. The child develops mental discomfort. Today, there is scientifically based research on the significant impact of physical education and sports on the formation of a healthy and harmoniously developed citizen of the republic, the ability of children to withstand the adverse effects of health and the external environment.

Physical education and sports stimulate the mental and spiritual well-being of children and adolescents, as well as instil feelings of patriotism and love for the Motherland.

Physical education and sports can give a lot to a child and a teenager.

It can occur as a result of physical development, physical qualities and movement skills, improvement of skills, increase of body resources and working capacity, strengthening of immunity against many diseases.

If a child's physical and motor skills are developed from an early age, they will be more effective as they grow older.

It is known that physical qualities are formed in a person from birth.

But the extent to which a child develops these qualities, whether he or she learns simple or complex movements, depends not only on the environment in which he or she lives but also on how the child develops certain physical skills.

Proper use of exercise, monitoring how children learn, allows them to develop the physical qualities of these children, their posture, the development of physical and motor skills in the right direction.

Studies by experts have shown that during the early school years, a child's physical skills and life movement skills develop more effectively through national and action games. Also, depending on the type, direction and purpose of physical activity (occupation, household, sports, military activity, etc.), the role of each physical activity in the performance of this movement will be different.

However, the integral development of these physical qualities is important in sports.

But often, in the course of all actions, the predominance of certain physical qualities is immediately apparent. The leading tasks of physical education in primary education include:

The tasks of physical education of this young generation include:

-Promoting health, strengthening students, promoting their proper physical development and maintaining high mental performance;

-Training of physical qualities (flexibility, strength, speed, agility, and endurance) and the formation of vital movement skills and abilities: walking, running, jumping, throwing, overcoming obstacles, line training;

-Equipping students with specialized knowledge and skills in the field of physical education and sports.

CONCLUSION

In summary, in the process of physical education and sports, students develop willpower qualities such as aspiration, initiative, perseverance, courage, discipline, as well as mutual friendship and appreciation of teamwork, which are necessary for them. feelings like homeland protection are formed.

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TWO-POINT SECOND BOUNDARY VALUE PROBLEM FOR A QUADRATIC SIMPLE SECOND-ORDER DIFFERENTIAL EQUATION SOLVED BY THE BERNOULLI EQUATION

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ABSTRACT

This article examines the uniqueness of the solution of the boundary problem for the second regular ordinary differential equation, which is solved in the Bernoulli equation. The uniqueness of the issue is proved by the principle of extremes.

KEYWORDS: *Bernoulli Equation, Unity of a Solution, Ordinary Differential Equation, Availability of a Solution.*

INTRODUCTION

Problem Statement

$$y'' + P_1(x)y' + P_2(x)y'^2 + P_3(x)y'^3 + P_4(x)y'^4 = P(x), \qquad x \in [x_0; x_1] \qquad (1)$$

equation and

$$y'(x_0) = y_0,\ y(x_1) = y_1 \qquad (2)$$

Find the function $y(x)$ that satisfies the boundary conditions. Here $P(x), P_1(x), P_2(x), P_3(x), P_4(x)$- given continuous functions.

Theorem. $p_1(x)-$ (1) is a special solution of equation (2) that does not satisfy the boundary condition, $P_3(x) + 4P_4(x)p_1(x) = 0$, $P_2(x) + 3P_3(x)p_1(x) + 6P_4(x)p_1^2(x) = 0$ and $P_1(x) + 2P_2(x)p_1(x) + 3P_3(x)p_1^2(x) + 4P_4(x)p_1^3(x) = Q_1(x)$,

$\int_{x_0}^{x_1} p(x)dx - \int_{x_0}^{x_1} p_1(x)dx \neq 0$ $Q_1(x) \neq 0$, $x_1 - x_0 \leq 1$,

$p_1' + P_1(x)p_1 + P_2(x){p_1}^2 + P_3(x){p_1}^3 + P_4(x){p_1}^4 = P(x)$

if the conditions are satisfied, then the problem S_1 has a unique solution.

ProofUsing the notation $y' = p(x)$ in Equation (1), we construct the following equation

$p'(x) + P_1(x)p(x) + P_2(x)p^2(x) + P_3(x)p^3(x) + P_4(x)p^4(x) = P(x)$ (3)

And condition $\int_{x_0}^{x_1} p(x)dx = y_1 - y_0$ (4) from the boundary conditions (2);

The resulting {(3), (4)} is in the new case

$$p(x) = p_1(x) + z(x), \quad (5)$$

By performing the substitution and after some elementary simplification we form the

$$z'(x) + \left(P_1(x) + 2P_2(x)p_1(x) + 3P_3(x)p_1^2(x) + 4P_4(x)p_1^3(x)\right)\cdot z +$$

$$\left(P_2(x) + 3P_3(x)p_1(x) + 6P_4(x)p_1^2(x)\right)\cdot z^2 + \left(P_3(x) + 4P_4(x)p_1(x)\right)z^3(x) +$$

$$+P_4(x)z^4(x) = P(x) - \left[p_1'(x) + P_1(x)p_1(x) + P_2(x)p_1^2(x) + P_3(x)p_1^3(x) + P_4(x)p_1^4(x)\right]$$

Equation. If we apply the conditions of the theorem to this equation

$$z'(x) + Q_1(x)z(x) = -P_4(x)z^4(x) \quad (6)$$

Based on the substitution of Bernoulli's equation and (4) from the boundary condition (5)

$$\int_{x_0}^{x_1} z(x)dx = \int_{x_0}^{x_1} p(x)dx - \int_{x_0}^{x_1} p_1(x)dx \quad (7)$$

we create the condition. (6) in equation

$$t(x) = 1/z^3(x) \quad (8)$$

by carrying out a replacement,

$$t'(x) - 3Q_1(x)t(x) = 3P_3(x) \quad (9)$$

while the equation and (7) condition

$$\int_{x_0}^{x_1} t(x)dx = \frac{1}{\left(\int_{x_0}^{x_1} p(x)dx - \int_{x_0}^{x_1} p_1(x)dx\right)^3} \quad (10)$$

we form the condition. As a result, we come to the new {(9), (10)} issue.

Let's assume, {(9'),(10')} issues $t(x) \not\equiv 0$, $x \in (x_0, x_1)$ to have solutions. Without it $\sup_{[x_0,x_1]} |t(x)| = M > 0$ here $x \in [x_0, x_1]$.

At first, we assume that $x \in (x_0, x_1)$. If this is the case, the $t(x)$ function x at the point to the value extremum will be able. Without it the $t(x)$ function'sfirst orderly to the surge $t'(x) = 0$. We have them given the fact and terms teorema,

$$\left[t'(x) - 3Q_1(x)t(x) \right] \geq 0 \ (< 0)$$

you will be able disparities. This while (9') is contrary to equality. It means that $x \in (x_0, x_1)$.

You $x = x_0$ say, $\forall x \in (x_0, x_1]$ for the $|t(x)| < |t(x_0)| = M$ disparity is appropriate. It (10') equal

$$M = |t(x_0)| = \left| \int_{x_0}^{x_1} t(x)dx \right| \leq \int_{x_0}^{x_1} |t(x)|dx < M(x_1 - x_0)$$

that $M < M(x_1 - x_0)$ the disparity stems from wrong see confirmation. It means that $x \neq x_0$ .The same (as 10') show, using equal you know, you can $x \neq x_1$ .Obtained from the above contradiction $x \in [x_0, x_1]$ to conclusions that come out. Veyershtrass this is contrary to teorema.

Therefore, $t(x) \neq 0$, $x \in [x_0, x_1]$ we assume that all is wrong. Then $t(x) = 0$, ie $t_1(x) = t_2(x)$, $x \in [x_0, x_1]$ stems from the fact that. The theorem is fully proved.

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AN OVERVIEW OF DEEP LEARNING IN AGRICULTURE

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ABSTRACT

Deep learning (DL) is a cutting-edge image processing and big data analysis method with enormous promise. Deep learning is a relatively new technique in the agricultural sector, but it has already shown to be effective in other fields. This article examines how various deep learning methods have been used to numerous agricultural issues, including disease detection and identification, fruit/plant categorization, and fruit counting, among other things. The article examines the models used, the data source, the results of each research, the hardware used, and the potential of real-time application to investigate future integration with autonomous robotic platforms. The findings show that deep learning produces high-accuracy results that, with a few exceptions, outperform conventional image processing methods in terms of precision.

KEYWORDS:*Deep learning, Agriculture Data, Network Applications, Neural Network, Accuracy.*

INTRODUCTION

Agriculture is a vital component of the global economy. This industry has undergone many transformations throughout the years in order to meet the needs of the world's increasing population, which has doubled in the past 50 years. There are many projections for continued global population growth, with the world's population projected to reach 9 billion people in 2050, a 60% increase. Furthermore, the projections show a rise in the number of people living in cities and a reduction in the ratio of working to retired persons[1]. This implies that global agricultural production must rise steadily and become less reliant on human labor. Agriculture was initially exposed to technology more than a century ago, with the first tractor being launched in 1913. Mechanical technology has advanced tremendously in recent years, with a vast array of commercial technologies accessible[2]. As a consequence, production rose and human labor was reduced to a minimum. However, it may not be enough to meet global demand in the coming years. Since the 1990s, several studies have been conducted to improve production efficiency, resulting in the concept of "precision agriculture," a farm management concept based on the

observation, measurement, and actuation of crop variability with the goal of optimizing returns while conserving resources.

More recently, existing industrial technologies such as remote sensing, Internet of Things (IoT), and robotics platforms have been adapted to agriculture, resulting in the idea of "smart farming" To meet the difficulties of agricultural production in terms of productivity, environmental impact, food security, and sustainability, smart farming is critical. To solve these issues, it is essential to study and comprehend agricultural ecosystems, which necessitates continuous monitoring of many factors. For certain processes, this results in massive quantities of data that must be stored and analyzed in real time[3]. Images may be used to create this data, which can then be analyzed using various image analysis methods to identify plants, diseases, and other objects in various agricultural settings[2]. Machine learning methods such as K-means, support vector machines (SVM), and artificial neural networks (ANN) are used in certain image processing approaches. Deep learning (DL) is a cutting-edge method that has been effectively used in a variety of fields. DL is a machine learning method that is comparable to ANN but has a greater learning capacity and therefore a higher classification accuracy. To speed up the processing time of complicated DL models, various methods using specialized hardware such as Field-programmable Gate Array (FPGA) or Graphics Processing Unit (GPU) have been employed. Several DL approaches have been applied to various agricultural practices in recent years, and they have gained in favor. A review of DL applications in agriculture is presented Some DL methods are also included in other larger review publications. These studies, on the other hand, do not examine factors like as time or hardware constraints imposed by the complexity of deep learning models. With the exponential development of this field, a large number of fresh research papers using DL to agriculture can be found in the literature. As a result, the emphasis of this article is on a review of current applications of DL methods to various agricultural domains, taking into account the hardware used to execute the program. To the best of our knowledge, other review papers do not cover the works described in this article.

The approach for this review study is presented. A short description of the Deep Learning concept. All relevant work using deep learning applied to agriculture is presented and evaluated in section four. The work's findings are. This evaluation is based on two major steps: searching for recent relevant work (within the last four years); and reviewing and analyzing the gathered material. The relevant work was gathered between April and May of this year, mostly using Google Scholar as a scientific search engine. The search was open to any deep learning technique, and 29 articles from 14 different agricultural fields were chosen. The analysis of related work aims to address the following questions: I problem identification; ii) type of data used; iii) deep learning architecture; iv) deep learning model; v) overall accuracy; vi) comparison to alternative machine learning techniques and similar works in the literature; vii) used hardware and real-time application The majority of works show the Top-1 and Top-5 accuracy; however we just show the Top-1 accuracy. Top-1 accuracy is the standard: the model response must match the anticipated answer precisely. Any of the model's five highest likelihood responses must match the anticipated result, according to top-5 accuracy. Some studies use the F1 score as a quality measure, which is sufficient for binary classification tasks. Typically, writers include a thorough explanation of their quality measures; for example, provide an explanation of the F1 score metric.Machine learning techniques based on artificial neural networks include deep learning (DL) (ANN). Deep learning has a wide range of applications, including natural language processing and image processing.

Deep Neural Networks (DNN), Deep Belief Networks (DBN), Recurrent Neural Networks (RNN), recursive neural networks, Fully Convolutional Networks (FCN), and Convolutional Neural Networks (CNN) are examples of deep learning architectures that have been successfully applied to a variety of research areas, including agriculture. DL adds to the complexity of ANN

by representing data in a hierarchical manner, using several levels of abstraction. Lower levels, for example, can recognize borders in images, whereas higher levels may distinguish things like as objects or faces. Researchers may create their own model using a variety of frameworks, topologies, and data sets that are publically accessible. CAFFE, Tensor Flow, Thea no, and the DL Matlab toolbox are among of the most popular frameworks for DL experimentation, and they are utilized in several of the papers evaluated in this article. Alex Net, VGG, CaffeNet, GoogleNet, and ResNet are prominent deep learning models that are freely accessible for study. They have the benefit of being pre-trained using open data sets, which means the network is ready to detect many characteristics. These designs all use the Image-Net3 or COCO4 data sets. The major drawback of DL may be the lengthy training period and need for strong parallel programming hardware (GPU, FPGA), while traditional techniques such as Support Vector Machine (SVM) or Scale-invariant feature transform (SIFT) offer easier training procedures. However, DL techniques have a shorter testing period and are usually more accurate. The following subsections provide a quick overview of the main architectures identified in this literature review: CNN, FCN, and RNN.

1.1 Application of deep learning in agriculture

In a total of 43 recent publications, 14 different areas of DL applications in agriculture have been discovered. Only 29 articles were chosen for this evaluation, however the list of the other papers is accessible to the public 5. Disease identification (6 papers), plant identification (4 papers), and land cover and weed identification (4 papers) are the most popular topics (3 papers each). CNNs have been utilized in 24 publications, with FCN and RNN being the only other options. This review's oldest piece was published in 2016. (one article). In 2017, 3 articles were published, 17 in 2018, and 8 in 2019. DL architectures like as CNN, FCN, RNN, Single Shot MultiBox Detector (SSD), and Bidirectional Long Short-Term Memory were utilized by the authors of the many articles that were reviewed (BLSTM). However, according to the present research, CNN has been the most often used DL architecture in recent years. O and CNN is only mentioned in two of them Some authors used a CNN/FCN or CNN/RNN combination, while others used R-CNN and/or Region Based Fully Convolutional Neural Networks (R-FCN). R-CNN, as its name implies, avoids the issue of classifying a large number of regions by classifying just a few at a time, reducing classification time. Fast R-CNN and Faster R-CNN are enhanced versions of R-CNN that are utilized in three publications to accomplish real-time object detection.R-FCN increases classification speed by decreasing the amount of labor required, and it is utilized in two publications. The majority of the writers relied on publicly accessible architectural models such as VGG, AlexNet, MatConvnet, DenseNet, and Darknet (Yolo), all of which were implemented using well-known frameworks (FW). however, it is not always apparent if the author created their own model from start or changed one of the existing models. The majority of the authors created their own data set using a variety of methods, including manually captured images, images from large public data sets like ImageNet or COCO, unmanned ground vehicles (UGV) [45], or unmanned aerial vehicles (UAV) equipped with sensors to capture the desired data. To increase the dataset and enhance the neural network's outcomes, the bulk of the writers used data augmentation. The majority of the papers compare their DL approach to other machine learning methods such as SVM, SIFT, Random Forest (RF), backpropagation (BP), Particle Swarm Optimization (PSO), Multilayer Perceptron (MLP), AdaBoost, Principal Component Analysis (PCA) plus Kernel SVM (kSVM), Random Forests Uncorrelated Plant (RFUP), Random Forests Correlated Field (RFCF), Random Forests Uncorrelated Plant (RFUP), Random Forest (RFCF). With a few outliers, when conventional techniques have the same or greater accuracy, the overall accuracy of the evaluated articles is usually excellent and exceeds other machine learning methods. Only four studies in this study worked with conventional Central Processing Units, demonstrating the hardware constraints imposed by the complexity of DL (CPU). The majority

of writers utilize high-end GPUs, while used a combination of GPU and FPGA to speed up their CNN model. Only 11 publications claim to be able to execute the test procedure in real time, despite having such powerful gear[4]. The remaining writers don't say how long their networks were tested.

This analysis concludes that DL techniques in agriculture are growing at an astronomically fast rate, with a wide range of potential applications and combinations with aerial and ground platforms such as UAVs or UGVs, as DL can be used in the process of automating these machines by collecting and processing data in order to give an order to the autonomous vehicle. The authors of this study, however, only collected data using unmanned platforms. Because of the hardware requirements, completely automating a robotic platform using deep learning may be limited. GPUs, the most common hardware platform for processing DL models, have high power requirements, which may be a constraint for a robotic platform that is usually electric and battery-powered. For distant severe agricultural terrains, running the required DL tools on a remote computer and therefore saving the battery life of unmanned platforms is not always possible. FPGAs may be a low-power option, however there is currently little study on these systems in agriculture, with just one paper identified for this review[5]. As the review demonstrates, deep learning outperforms most conventional machine learning techniques in terms of accuracy, and real-time application, which is critical for autonomous cars, is difficult to achieve without DL approaches since other methods need more testing time, for example, describe a study on AGV localization in a steep slope vineyard[4]. They utilize an SVM classifier to identify natural characteristics, which needs precise and real-time detection, which this study lacks. Real-time detection is not guaranteed even with its GPU implementation. Other DL methods, as shown in the works reviewed here, may be able to conduct a faster and more accurate detection, thereby addressing the issue of localization. To summarize, DL is on the right track to collaborating with a variety of agricultural fields, and research should continue to concentrate on low-power hardware and integration with autonomous platforms[5].

1.2 Convolutional Neural Networks:

CNNs are a kind of deep, feed-forward artificial neural network that has been used to address computer vision issues. Our is the most frequent architecture, and it appears in nearly every article in this review. CNN, unlike ANN, can learn complicated problems rather quickly owing to weight sharing and sophisticated models that allow for parallelization[6]. The various convolutions are executed at certain levels of the network, producing distinct representations of the dataset, as[4]. The pooling layers decrease the dimensionality of the input pictures, so the convolutional layers serve as feature extractors[6]. The fully connected layers serve as classifiers, using high-level characteristics to categorize incoming pictures into the appropriate category[7].

If a big enough dataset is available, CNNs improve the likelihood of accurate classifications. Data augmentation is a popular method for expanding the data set and improving CNN accuracy. The dataset may be expanded by performing a series of random transformations to the original pictures, such as rotation and translation, since CNNs are invariant to translation, size, and illumination.

1.3 Fully Convolutional Networks:

FCN is a Convolution neural architecture that generates a semantic mask as an output via down-sampling (convolution) and up-sampling (deconvolution) [4]. The input picture is often reduced in size to allow it to pass through many convolution layers, with the output being a single predicted label for the input image. FCN networks do not downscale the picture, thus the output is not a single label, allowing the output to be up-sampled and the class to be predicted pixel-by-pixel.

LITERATURE REVIEW

The increasing availability (and varying complexity and types) of Internet of Things (IoT) devices, as well as the large data volumes that such devices (potentially) generate, can have a significant impact on our lives, spurring the development of critical next-generation services and applications across a wide range of application domains (e.g. healthcare, smart grids, finance, disaster management, agriculture, transportation and water management). Deep learning, which has previously proven effective in computer vision and language modeling, is now finding use in other areas thanks to the availability of vast and varied datasets[8]. One example is the use of Deep Learning technology to enhance human health via improvements in medical diagnosis and prediction. However, moving massive data streams (a prerequisite of Deep Learning technologies for attaining high accuracy) to centralized places such as Cloud datacentre settings in a timely and reliable way is regarded as a major barrier to extending the application frontiers of such technologies. To this aim, a number of paradigms have been suggested, including Osmotic Computing, which encourages the spread of data analysis activities between Cloud and Edge computing platforms.

Deep Learning (DL) techniques like as Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), and Generative Adversarial Networks (GAN) have been extensively researched and used in a variety of areas, including agriculture, in recent years[9]**.** Agricultural researchers often utilize software frameworks without thoroughly investigating the concepts and processes of a method. To assist agricultural researchers in rapidly gaining a holistic view of key DL methods, this article offers a brief description of major DL algorithms, including principles, limits, implementation, training procedures, and sample codes. In this paper, research on DL applications in agriculture is summarized and analyzed, and future opportunities are discussed, with the goal of assisting agricultural researchers in better understanding DL algorithms and learning major DL techniques quickly, as well as facilitating data analysis, enhancing related agricultural research, and effectively promoting DL applications.

The fast development of new technologies, as well as the changing landscape of the online world (e.g., Internet of Things (IoT), Internet of All, cloud-based solutions), provide a once-in-a-lifetime opportunity for creating automated and robotic systems for urban farming, agriculture, and forestry[10]. Robotic systems and intelligent technologies for precision agriculture have been developed and implemented thanks to technological advancements in machine vision, global positioning systems, laser technologies, actuators, and mechatronics. We show and discuss robotic plant pathology and management applications, as well as new agricultural technology for intra-urban agriculture, in this paper. In recent years, sophisticated greenhouse management systems and technologies have progressed significantly, including IoT and WSN (Wireless Sensor Network). Agriculture has used and used machine learning, machine vision, and AI (Artificial Intelligence) for automated and robotic farming. Machine vision/learning-based intelligence systems have been created not just for planting, watering, weeding (to some degree), trimming, and harvesting, but also for detecting and identifying plant diseases.

DISCUSSION

Agriculture goods are in high demand throughout the globe as a result of population increase. As a result, more agricultural output is required. Nowadays, cutting-edge technologies such as machine learning, deep learning, IoT, and robots are being utilized to boost agricultural output, save expenses, and enhance revenue. Rain, cyclones, floods, climate fluctuations, weeds, pests, and a shortage of personnel are some of the variables that influence crop development in agriculture. As a result, farmers are increasingly turning to deep learning technologies to enhance crop management and other agricultural applications. Deep learning will have a significant impact on agriculture in the future. Agriculture provides the country's food security, which is

why it is considered the country's backbone. It is crucial to the majority of the country's foreign commerce. Agriculture provides a living for roughly 75% of people in most areas of the globe. Because of the growth in population, there is a need to enhance agricultural output, therefore we must improve the condition of agriculture. Farmers are searching for cost-effective methods to improve crop output while maximizing the use of existing resources. This helps farmers make better choices and improve yields by introducing new digital technology into the agricultural sector. We can now solve numerous difficulties and obstacles in agricultural sectors utilizing deep learning techniques.

CONCLUSION

A review of DL-based research activities in agricultural areas was provided in the current article. It looked into the agricultural field and described the problem they were trying to solve, listed technical details like the DL architecture and model, described the data source, reported the overall accuracy of each work in comparison to alternative methods, verified the used hardware, and discussed the possibility of real-time applications. The results show that DL achieved excellent precision in the majority of the evaluated works, outperforming other conventional techniques. The primary benefit of non-DL methods is that the classification process takes a short amount of time, making real-time execution simpler. The hardware limitation may be the most significant drawback, since they need mostly strong GPUs with high power consumption. In the agricultural sector, alternative reduced power demand solutions (FPGAs) are currently undergoing limited study. For appropriate real-time integration with autonomous robotic platforms (AGVs), research should concentrate on reducing the complexity and hardware requirements of current efficient DL methods.

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DATA MINING TOOLS IN AGENT-BASED SYSTEMS: A COMPARATIVE ANALYSIS

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ABSTRACT

The acceptance and use of open source tools has changed dramatically as a result of global technological progress. Because most businesses across the world deal with a significant quantity of data that has to be updated online on a regular basis, and transactions happen every second, organizing, mining, and processing this dynamic data is very difficult. A thorough examination of the different tools and algorithms accessible to data mining specialists is required for successful application of the method. This paper compares the open source data mining technologies that are accessible to experts. The parameters that influence the selection of appropriate tools, as well as the real-time difficulties, are addressed. Agents, on the other hand, have been shown to improve the performance of data mining tools. This paper offers details on an agent-based architecture for data preparation, as well as implementation details, in order to help the industry create better tools. Integration of open source data mining tools with agent simulation allows for the implementation of an effective data preparation architecture, resulting in an application with strong capabilities that can be updated with little preplanning from the application developer.

KEYWORDS: *Agent based framework, Agent simulation, Agents, Data Mining, Data Mining Tools.*

1. INTRODUCTION

Organizations may now store complicated data in many places and update it in real time thanks to recent technological advancements. Any organization's primary issue is to properly handle huge amounts of frequently updated data online. One of the limiting characteristics of the Data Stream Management System has always been its inability to query both live and archive data at the same time[1]. Data mining is a technique for analyzing and discovering new patterns in data from different sources. The data mining approach is capable of solving emergent issues such as the identification of patterns and information in ambiguous, high-frequency, organizational, or

behavioral data, as well as data produced and stored in different locations systems[2], [3]. Data mining is used to obtain current information, but it adds to the complexity of data processing, management, and mining. Weka, RapidMiner, TANAGRA, Orange, and KNIME are some of the most widely used open source data mining technologies. Handling Complicated Problems, Discovering Unknown Patterns, Skill Required in Working with the Tool, Scalability, and Data Mining Tools offer us with a user pleasant interface for data analysis. Data mining software should be able to handle big datasets, according to Cost. A client server environment is required for data mining tools, according to Computer system environment. Product track record, vendor viability, breadth of data mining techniques, compatibility with a particular computer system, ease of use, and capacity to handle huge datasets are all factors to consider when evaluating data mining technologies.

Pharmine Company's data mining specialists have compiled a study on data mining tool comparisons, which assesses different data mining programs such as KNIME, Rapid Miner, Weka, Tanagra, and Orange[4], [5]. The result chart of the Data Mining Tool Comparison produced by Pharmine study is shown in Table 1.

TABLE 1: COMPARATIVE ANALYSIS OF DATA MINING TOOLS[5]

Procedure	KNIME	RapidMiner	Weka	TANAGRA	Orange
Partitioning of dataset to training and testing sets	Have with limited partitioning abilities	Have with limited partitioning abilities	Have with limited partitioning abilities	Have with limited partitioning abilities	Have with limited partitioning abilities
Descriptor Scaling	Have the facility	Have the facility	Does not have the facility to save parameters for scaling to apply to future datasets	Does not have the facility to save parameters for scaling to apply to future datasets	Does not have the facility of scaling
Descriptor Selection	Has no wrapper methods	Have the facility	Have the facility but not the part of knowledge flow	Have wrapper methods that is valid only for logistic regression	Has no wrapper methods
Parameter optimization of machine learning/statistical methods	Does not have automatic facility	Has the facility	Does not have automatic facility	Does not have automatic facility	Does not have automatic facility
Model validation using cross-validation and/or independent validation set	Have only limited error measurement methods	Has the full facility	Have the facility but is not capable of saving the model so have to rebuild model for every future data set	It does not have the capability of validating independent validation set	Have the facility but is not capable of saving the model so have to rebuild model for every future data set

One of the most difficult aspects of data mining is dealing with noisy data[6]. The existing data mining technologies do not enable real-time modeling, which allows for the acquisition of new models or knowledge as new data is uploaded. In practice, a data miner will remodel to guarantee that fresh information is acquired. This restriction causes problems in a variety of applications, including medical, stock market, and financial. These fields are crucial for having current knowledge since they have an impact on human existence and corporate performance. A thorough examination of the different tools and methods available is required for successful data

mining deployment. However, the present information age has pushed businesses to cope with gigabytes and terabytes of database instead of megabytes of database.

Data mining techniques become less and less efficient as data sets grow in size. This is an essential aspect of a data mining tool since it encourages us to examine the tool's performance[7]. It is costly to integrate the most recent knowledge model into existing data mining technologies. Every time new data arrives, it must be cleaned and mined dynamically. Furthermore, users must choose a suitable time to conduct data mining, which is another time-consuming issue. Expert users are required to conduct trials using the available data mining tools in order to get a usable knowledge model, and this should be done in a manner that treats all data equally. The user's understanding influences the method selection. Existing data mining techniques do not allow for the addition of new data or the re-modeling of knowledge when substantial new data is introduced. To obtain the updated knowledge model, the fresh data should be mined again. As a result, the existing data mining tools are not appropriate for inexperienced users.

Agent-based systems are the best way to solve the problems mentioned above. Because of their independent, flexible, adaptable, and intelligent features, agents have become a popular computer paradigm in recent years. Intelligent agents act in a logical manner. Intelligent agents do tasks with human intellect, yet they may not act like humans. When compared to traditional mining tools, the agent engaged in mining processing performs productive tasks, recovers valuable information with less noise, and reduces processing time. Agent-based data mining techniques may include the following features:

a. Propose the data-processing methods that are most appropriate.

b. Preprocess fresh data in accordance with the user's profile.

c. Exchange mining knowledge

d. Suggestions for potential information that may be derived from data using the shared experience

e. Appropriate for inexperienced users.

1.1. Agent Based Modeling and Simulation:

One of the driving factors in the development of computer systems has been computer-based modeling and simulation of (real-life) complex systems. A simulation is defined as the simulation of the functioning of a process or a real-world system over time. A computational model is a computer program that represents a real-world system using a collection of algorithms and mathematical formulae written as code in a programming language[8].

The goal of computational models, unlike pure mathematical models, is generally not to find analytical answers to particular problems. Computational models, on the other hand, allow for the creation of experiments to evaluate the created models in various situations (with different parameter configurations)[9]. These tests are carried out with the goal of determining how the modeled systems behave given a set of assumptions. This testing enables the designer to get insight into some features of a complicated system that would be impossible to discover through mathematical analysis, or for issues for which no tractable mathematical model exists.

A system is represented in ABMS as a collection of independent creatures known as agents. Each of these agents is placed in an environment (virtual or real) from which it receives information via the use of sensors and makes choices based on its perception of the environment and its goals. These choices are then reflected in activities taken to alter the environment's condition (i.e. direct actions to the environment, communication with other agents, further reasoning).

Depending on the system it populates, an agent may act in a variety of ways. Reactivity – the capacity to respond to events in the environment; pro-activity – the ability to exhibit some behavior defined by its specific aims, taking the initiative to meet its needs; and sociability – the ability to connect with other agents and people to achieve its goals. These characteristics provide a new kind of abstraction for the representation of problem domains, allowing agent-based systems to be more versatile than traditional object-based systems.

1.2. Existing Agent Simulation Tools:

We'll talk about popular agent simulation programs like Aglets, JATLite, FTP Software Agent, and Voyager in this part.

Aglets are IBM-developed Java-based autonomous agents that offer the fundamental mobility capabilities and have a globally unique name. A trip itinerary specifies the locations to which the agent must go as well as the activities that must be taken at each site. In order for an aglet to execute on a given system, the target system must be running an aglet host application, which provides the aglet with a platform-independent execution environment. A customizable Java security manager is included in the aglet workbench. Aglets may interact via a whiteboard, which enables agents to work together and exchange information in real time. Aglet communication supports both synchronous and asynchronous message passing. Aglets are serialized or externalized using normal Java serialization. The byte code stream and state of an aglet may move over a network with the help of a network agent class loader.Aglets are IBM-developed Java-based autonomous agents that offer the fundamental mobility capabilities and have a globally unique name. A trip itinerary specifies the locations to which the agent must go as well as the activities that must be taken at each site. In order for an aglet to execute on a given system, the target system must be running an aglet host application, which provides the aglet with a platform-independent execution environment. A customizable Java security manager is included in the aglet workbench. Aglets may interact via a whiteboard, which enables agents to work together and exchange information in real time. Aglet communication supports both synchronous and asynchronous message passing. Aglets are serialized or externalized using normal Java serialization. The byte code stream and state of an aglet may move over a network with the help of a network agent class loader.

FTP Software Agent Technology is Java-based software that uses agent technology to handle heterogeneous networks over the Internet. The agents are self-contained and mobile, with the ability to travel to any machine on the network that has an Agent Responder installed. The agent's duties may vary as it travels from system to system, depending on the environment of the system it is visiting. As required, the agents may communicate with other agents or with the user. FTP agents, on the other hand, do not need human involvement since they utilize push technology to travel from system to system, react to events, and execute tasks depending on user-defined criteria. The launch of the agent is the responsibility of an Agent Manager.ObjectSpace, Inc.'s Voyager is a Java-based agent-enhanced Object Request Broker (ORB)[10]. An ORB enables the creation of objects on a distant system and the invocation of methods on those objects. Voyager adds agent capabilities to the conventional ORB. Agents of the Voyager class have mobility and autonomy, as does the base class Agent. An Agent may relocate to a new location and leave a forwarding address with a secretary so that future communications can be sent to the new site. Messages are delivered by specialized agents known as Messengers. Messages may be synchronous, one-way, or future. Future messages are asynchronous but provide a placeholder that can be used to obtain a return result at a later time. The itinerary of an agent specifies the actions that must be performed at each site. The security manager in Voyager may be used to limit the operations that an agent can do.

2. DISCUSSION

2.1. Architecture Development:

Large amounts of data are generated and kept in databases as a result of the development of online transactions, the World Wide Web, data streams, and other technologies, which is one of the reasons for data management's complexity. It may be difficult for novice users to identify the optimal method for pre-processing their data in order to conduct data mining. As a result, specialists are needed to choose the optimum pre-processing method. Neither data mining technologies nor users have adequate expertise in the data mining area to handle dynamic and complicated data at this time. When an agent-based data mining system is used, the agent chooses the method and parameters that give the best model for generating excellent decisions. Because existing data mining techniques are domain specific, this study focuses on proposing a generic architecture that can pre-process data utilizing agents from any domain. Furthermore, the suggested design is simple enough for even a beginner user to utilize.

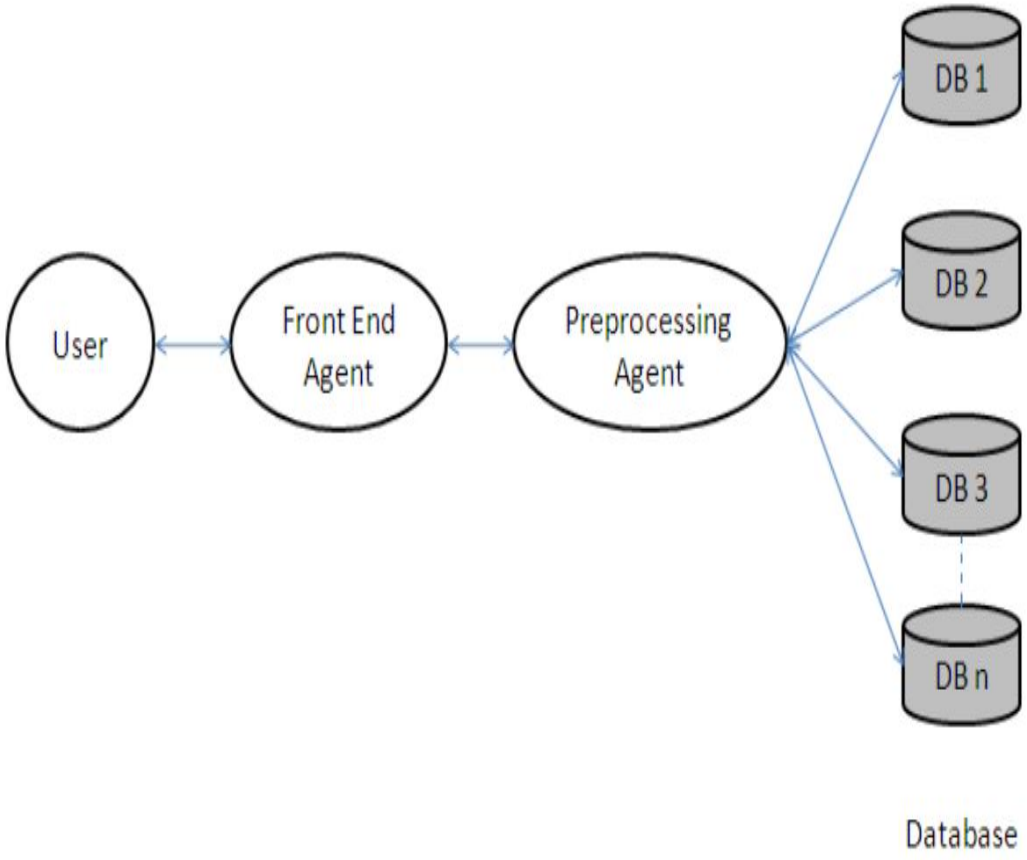

Figure 1: Illustrates the Pre-processing Architecture.

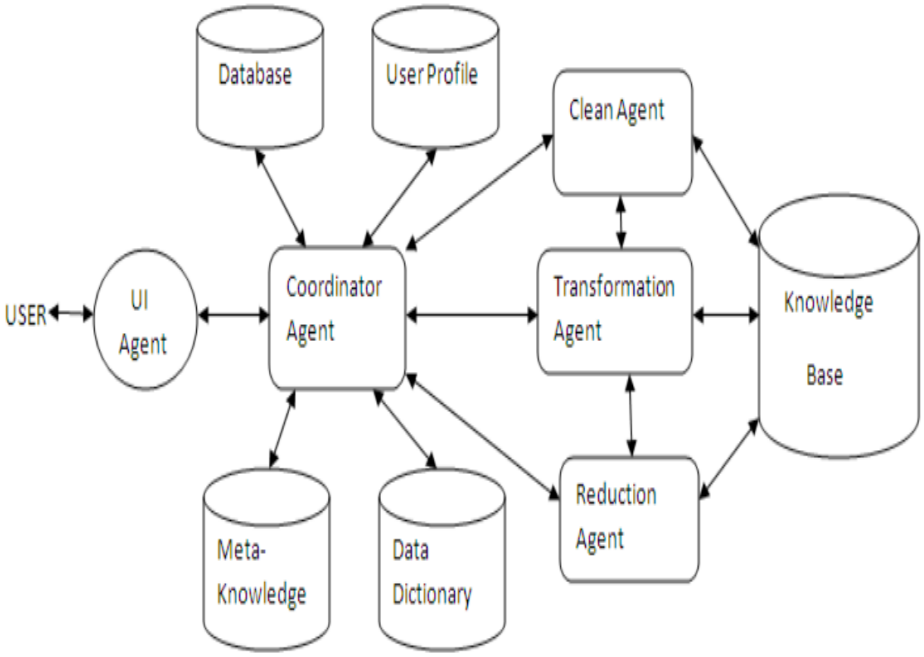

Figure 2: Illustrates the detailed Pre-processing Architecture.

The fundamental concept of Pre-processing architecture shown in Figure 1 is the suggested design. User Interface Agent (UI Agent), Coordinator Agent, Clean Agent, Transformation Agent, and Reduction Agent are the five main agents in the framework. The above-mentioned pre-processing architecture is shown in Figure 2. Each agent's duties and skills are unique. The User Interface Agent is in charge of the system's user interface. It does solution analysis on its own and assists the user in formulating questions based on their needs. The coordinator agent is in charge of coordinating all of the tasks carried out in the system. It decides the pre-processing technique to be utilized depending on the data mining job provided by the user, which is created using the agent's Meta knowledge. It has access to a dynamically updated data store and delivers data to the other agents. The coordinator agent also does adaptive profiling of user data as well as tests to identify the database's data kinds and characteristics. It detects the issues with the data and saves the information and appropriate preparation method for them. Clean Agent uses the methods in the data dictionary to deal with missing and noisy data. The Transformation Agent is used to convert the data into mining-friendly formats. The reduction agent's job is to shrink the size of the data by using discretization methods.

2.2. Implementation of the Agent Based Preprocessing Architecture:

The architectural model presented is a client-server architecture with a simple Model View Controller Architecture. The above-mentioned architecture may be implemented in a variety of ways, including creating both an agent and an application, or modifying an application's existing code to allow the required communication. All of the preprocessing techniques may be found in a variety of open source data mining and agent simulation programs.

The following are the criteria for the proposed agent framework:

a. The ability to imbue programs with intelligence.

b. An intelligent agent framework may be used to address real-world issues.

c. The architecture must be adaptable enough to accommodate a wide range of applications.

d. Intelligent agents enhance the application's functionality and may interact with one another and other apps.

e. The agents are in charge of calling the shots, as well as monitoring and controlling the applications.

2.3. Functional Specification of Agent Framework:

The following requirements are always included in Agent Framework functionality:

a. Adding an intelligent agent to an existing application should be simple.

b. To assemble agents out of other Java components and other agents, a graphical building tool must be provided.

c. The agents must be able to handle somewhat complex event processing. Events from the outside world, other agents, and signal events to external applications will all be handled by the agent.

d. Domain information may be contributed to an agent using if-then rules, and sensors and effectors can enable forward and backward rule-based processing.

e. Using learning techniques, the agents must be able to learn to perform classification, grouping, and prediction.

f. A KQML-like messaging protocol must be provided for multi-agent applications.

g. The agent must be tenacious. That is, once an agent is built, it must be possible to store its state in a file and reload it at a later time.

Because open source data mining tools and agent simulation tools are now available for the implementation of the architecture, it is now possible to append an agent to an existing application, thereby extending the application's basic capabilities with minimal pre-planning on the part of the application developer.

3. CONCLUSION

Organizations can dynamically store, analyze, and update large and complicated data thanks to technological advancements. The usage of the appropriate software tools is required for the creation and implementation of data mining methods. Furthermore, existing data mining techniques are prohibitively costly when it comes to obtaining an updated knowledge model. This paper focuses on two elements of data mining tools: elucidating a comparative analysis of different open source data mining tools and presenting the difficulties that currently exist in data mining tools. Agents, on the other hand, are known to help data mining technologies work better. As a result, in order to build an effective data preparation architecture, this paper proposes integrating current data-mining tools with agents. The functional requirements given here allow the application developer to thoroughly examine, evaluate, and build the data preparation tool for better data management.

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PREDICATION OF ESSENTIALS GENES FOR RHEUMATOIDARTHRITIS USING MACHINE LEARNING

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ABSTRACT

Machine learning is a subfield of computer programming that investigates the construction of machine learning tree algorithms. Learning, predictive modelling, grouping, and finding predicted patterns are all examples of machine learning activities. These activities are learnt via the use of data that has been gathered through observations and instructions. The industries that collect large amounts of data need to be able to analyse and learn from it, and software like R allows users to visualize data, run statistical tests, and apply machine learning algorithms. R is a programming language that does not have a graphical user interface with buttons to run different methods. Data growth required the development of statistical techniques for analysing big datasets, which in turn prompted the development of computer power. Rheumatoid arthritis (RA) is an inflammatory, progressive illness that may lead to joint damage and disability if not treated properly. The existence of certain clinical and laboratory evidences may be used to predict the prognosis of RA. New RA categorization standards open up the possibility of early therapy. Treatment with a combination of DMARDs combined with a short term of corticosteroid is anticipated to prevent progression of RA and even alter the natural course of the disease. Patients with clinical synovitis in at least one joint may now have confirmed RA, which need urgent therapy.

KEYWORDS: *Machine learning, R language, gene analysis, Rheumatoid arthritis, Unsupervised learning.*

INTRODUCTION

Early in the course of rheumatoid arthritis (RA), patients rely heavily on strong pharmaceutical management of inflammation. Despite the significance of choosing the best medicine as soon as possible following the start of the illness, there is no good biomarker predictor of pharmacological treatment success. As a result, while a physician looks for an effective medication, RA patients often suffer permanent joint damage. Disease-modifying anti-rheumatic

medications are the first-line treatment for RA, whereas novel biologic therapies, such as those that block the inflammatory cytokine TNF-alpha, are extremely effective but only achieve remission in 30% of patients. The pharmacological treatment is chosen depending on the severity of the illness and the clinical prognostic characteristics[1].

A genetic biomarker linked to a high probability of biologic drug response may shift the paradigm and enhance early RA disease outcomes. The choice of treatment is based on the severity of the RA disease as evaluated during clinical visits. In RA clinical trials, the main objective is standardized disease activity levels evaluated at regular intervals. However, identifying disease activity in observational Electronic Medical Record (EMR) data before and after medication exposure is difficult because physicians seldom record disease activity in structured categories and instead describe it as free text in the clinical narrative. For example, we have a structured disease activity tool and a longitudinal cohort study at our institution that gather disease activity data at individual patient visits, however these structured data are only accessible on a small percentage of visits[2].

The Disease Activity Score in 28 Joints (DAS28) is an example of a structured tool utilized by Partners HealthCare. The instrument is assessed by study rheumatologists for RA patients who are followed yearly in a cohort study. DAS28 is a clinical trial composite indicator that has been created and validated. It is based on patient-reported global health evaluation and weighted factors for swollen joint count, painful joint count, C-reactive protein level (CRP) or erythrocyte sedimentation rate (ESR)[3]. The initial DAS algorithm was based on clinical and laboratory data collected by six rheumatologists over the course of three years in a prospective trial. Based on correlations with drug modifications, they classified disease activity as high, moderate, low, or remission. The DAS algorithm was verified in more RA patients after it was created, and it was ultimately used on thousands of patients in clinical studies, patient registries, and regular office visits. Despite the fact that the initial study was conducted in just 113 RA patients in the 1980s[4], before the advent of biological DMARDs, the algorithm's key components are still in use today.

The discovery of genetic and environmental risk factors for RA has prompted the issue of whether these risk factors are adequate to identify who is at risk of developing the illness. Indeed, predicting who may acquire illness before symptoms appear is one of the ultimate goals of genetic study. It's also worth noting that the genetic markers discovered so far account for just approximately half of the heritability of RA. Other research to account for a greater percentage of disease heredity, as well as the inclusion of additional risk variables including environmental factors, biomarkers, and clinical predictors, would almost likely enhance the prediction models' power and make them more clinically relevant[5].

Rheumatoid arthritis

The most prevalent chronic inflammatory arthritis in adults is rheumatoid arthritis, which affects between 1.3 and 1.8 million Americans. It's an illness with an unknown cause but an immunological component. RA affects more women than males and may strike at any age, with a peak incidence in the 50s and 60s. Morning stiffness and symmetrical joint swelling of the feet, hands, and knees are classic symptoms of RA, although any joint (and, in rare instances, internal organs and skin) may be affected. RA is a clinical condition that, if left untreated, may result in irreversible joint damage and deformity in certain people. Skin, eye, heart, lung, hematologic, and other extra-articular symptoms may sometimes complicate the course of RA. Patient education, psychological support and treatment, physical and occupational therapy, medicines, and, if necessary, joint surgery are all part of the RA management process[6]. The medicines utilized are classified as either treating symptoms simply or targeting tissue damage processes, which are known to as disease-modifying anti-rheumatic therapies. Methotrexate, leflunomide,

hydroxychloroquine, and sulfasalazine are examples of traditional DMARDs having wide immunomodulatory effects. More recently, a group of biologic and non-biologic medicines known as "targeted immune modulators" (TIMs) have been widely used to target mediators of inflammation in RA. In the past, RA was linked to increasing disability and a shorter lifespan, but advances in early diagnosis and active TIM usage have significantly improved survival and other important outcomes in the last 20 years[7]. The comparative clinical efficacy, possible hazards, and comparative value of the main TIMs used in the treatment of moderately-to-severely active RA despite previous traditional DMARD therapy, as well as two medicines under regulatory evaluation for this indication, are the subject of this study.

Rheumatoid Arthritis Treatments

Treatments for DMARDs may be administered alone or in combination (either with each other or more commonly, with TIMs). Inflammation is also controlled with the use of steroids.

The following are the most frequent agents:

- Methotrexate is an antimetabolite that blocks the production of folate in rapidly proliferating cells. Methotrexate at a low dosage is suggested as the first-line treatment for RA. It may also be used with a variety of TIMs to generate outcomes that are usually superior to TIM monotherapy. Methotrexate, on the other hand, is linked to a risk of hepatotoxicity, necessitates regular laboratory monitoring and folic acid supplementation, interacts with a variety of other medications, and should not be used in patients with serious liver or kidney disease, or in couples planning to conceive.
- Sulfasalazine is a sulfa medication that contains salicylate (the active component in aspirin) and the antibiotic sulfapyridine. Daily oral usage has been proven to help reduce joint inflammation in people with RA, especially in the early and milder phases of the illness. Nausea and stomach pain are common side effects, and sulfasalazine may also make you more sensitive to sunlight and cause skin discoloration.

Prediction Modelling Overview

Our analysis was carried out using the REGENT (Risk Estimation for Genetic and Environmental Traits) R package, which was created inside our unit. The literature is used to identify hereditary and environmental factors for inclusion in REGENT. In order to evaluate precision, allelic ORs, allele frequencies, and number of respondents from relevant research are needed. ORs, standard errors, and the percentage of the population exposed to the risk factor are all required for environmental risk factors. These risk variables are entered as summary statistic input files into REGENT, which are handled in two stages: the first builds the prediction model, and the second executes the prediction model using real-world data[8].

Components of Prediction Models Discovered Through Meta-Analyses

- *Factors that Increase the Risk of Cancer*

Utilizing two large, newly published meta-analyses, we discovered genetic susceptibility variations for possible inclusion in our prediction modeling. Only susceptibility alleles with genome-wide significance were included, ensuring that the alleles simulated were true RA genetic risk factors.

- *Factors Endangering the Environment*

In our simulations, we incorporated the environmental risk factor of smoking. Other factors that have been proposed to influence RA risk, such as alcohol, were not included for two reasons: first, the evidence supporting these claims is shaky, with associations frequently found in case-control studies rather than cohort studies, and second, detailed data on non-smoking risk factors was not captured in WTCCC and UKRAGG.

Aspects

Rheumatoid arthritis is thought to be caused by a mix of hereditary and environmental variables, many of which are unknown. Rheumatoid arthritis is an autoimmune illness, which is a broad term for a set of diseases in which the immune system targets the body's own tissues and organs. The immune system in individuals with rheumatoid arthritis causes aberrant inflammation in the joint membrane (the synovium). When the synovium becomes inflamed, the joint becomes painful, swollen, and stiff. In extreme instances, the inflammation spreads to the joint's bone, cartilage, and other tissues, causing more significant injury. Rheumatoid arthritis that affects other areas of the body is likewise characterized by abnormal immune responses. Variations in hundreds of genes have been investigated as rheumatoid arthritis risk factors. The immune system is thought to be implicated in the majority of these genes[9]. Variations in human leukocyte antigen (HLA) genes, particularly the HLA-DRBI gene, are the most important genetic risk factors for rheumatoid arthritis. HLA genes generate proteins that aid the immune system in distinguishing between the body's own proteins and proteins produced by external invaders. Other genes seem to have less of an effect on a person's overall chance of getting the disease.Other non-genetic variables are thought to have a role in the development of rheumatoid arthritis. Although the process is unknown, several variables may cause the disease in individuals who are at risk. Changes in sex hormones (especially in women), occupational exposure to specific types of dust or fibers, and viral or bacterial infections are all potential causes.

MACHINE LEARNING

Machine learning has emerged as a key technique for data mining and modeling in both medical and IT research. Machine learning is already in use across the globe, with Google's Alpha, Tensor Flow, Microsoft Azure, and IBM's Watson being just a few examples. Clustering, a typical technique of unsupervised learning, was employed in this study to predict rheumatic illness patients in advance.

The empirical examination of an algorithm's behavior was one of the assessment methods described above, and this approach is common enough in machine learning to warrant additional explanation. The laws of combining volumes and the ideal gas law, for example, are empirical in character, which implies that their theories are founded on solid actual facts. This is a positive indication that an increasing number of machine learning researchers are concentrating their efforts on finding similar occurrences in the behavior of learning systems. Many disciplines express such occurrences as relationships between independent and dependent variables. The structure of the information to be acquired and the regularity in the environment are two natural independent concepts in machine learning (e.g., the amount of noise in the data)[10]. For incremental learning techniques, you may change the sequence in which data is given and the environment's stability over time. The majority of natural dependent measures are linked to a performance criteria, such as diagnostic accuracy (for classification tasks) or solution route quality (for problem-solving tasks). However, they aren't the only factors, and finding meaningful independent words and usable metrics is an essential job for machine learning researchers.

Types of Machine Learning

Supervised Learning

Supervised Learning algorithm learns from a known data-set (Training Data) which has labels to make predictions. Regression and Classification are some examples of Supervised Learning.

CLASSIFICATION

Classification determines to which set of categories does a new observation belongs i.e. a classification algorithm learns all the features and labels of the training data and when new data is given to it, it has to assign labels to the new observations depending on what it has learned from the training data.

REGRESSION

Regression is a supervised learning algorithm which helps in determining how one variable influences another variable.

Unsupervised Learning

Unsupervised learning algorithm draws inferences from data which does not have labels. Clustering is an example of unsupervised learning. “K-means”, “Hierarchical”, “Fuzzy C-Means” are some examples of clustering algorithms. Unsupervised learning problems can be further grouped into clustering and association problems.

Clustering:

A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behaviour.

Association:

An association rule learning problem is where you want to discover rules that describe large portions of your data, such as people that buy X also tend to buy Y.Some popular examples of unsupervised learning algorithms are:K-means for clustering problems and Apriori algorithm for association rule learning problems.

HOW MACHINES DO LEARNS?

The fundamental learning process is the same whether the learner is a person or a computer. It may be broken down into three parts, as follows:

- Data input: Observation, memory storage, and recall are used to give a factual foundation for subsequent reasoning.
- Abstraction: This is the process of transforming facts into more abstract representations.
- Generalization: It is a method of taking action based on abstracted facts.

The most fundamental job for a learning algorithm is to represent raw input data in a structured manner. Prior to this moment, the data is nothing more than a collection of ones and zeros on a disk or in memory, with no significance. During the abstraction phase, the task of giving a meaning to data takes place. The computer summarizes raw inputs in a model, an explicit description of organized patterns among data, during the knowledge representation process. The computer summarizes raw inputs in a model, an explicit description of organized patterns among data, during the knowledge representation process. Models come in a variety of shapes and sizes. Some of these may be known to you. Equations, diagrams such as trees and graphs, logical if/else procedures, and groupings of data are just a few examples.

The machine is seldom given the option of selecting a model. Instead, the learning goal and the kind of data being analyzed determine the model. Training is the process of fitting a certain model to a dataset. To begin, keep in mind that the learning process does not stop with the data abstraction phase. Learning necessitates an extra phase in which the knowledge is applied to future data. Second, the word "training" provides a better description of the actual process of fitting the model to the data. Learning entails a kind of bottom-up, inductive thinking. The term "training" refers to the fact that the machine learning model is imposed on the machine pupil by a human instructor, giving the computer a framework to model after.

The process of transforming abstracted information into a form that can be used for action is known as generalization. Generalization is a rather nebulous and difficult-to-describe process. It was formerly thought to be a search across the full collection of models (or hypotheses) that might have been abstracted during training. In particular, consider a hypothetical set comprising every conceivable hypothesis that might be formed from the data; generalization entails condensing this set into a manageable number of significant results.Bias is an unavoidable byproduct of every machine learning task's abstraction and generalization processes. Every learner has flaws and is prejudiced in some manner; there is no one model that can account for all of them. As a result, the last stage in the generalization process is to assess the model's success, biases and all.

A model is evaluated on a new dataset after it has been trained on an original dataset, and its characterisation of the training data is assessed on how well it generalizes to the new data. It's worth mentioning that a model's ability to fully generalize to every unexpected circumstance is very uncommon. Part of the reason why models fail to generalize properly is because of noise, or unexpected fluctuations in data. Noise in data is produced by occurrences that seem to be random, such as:

- Measurement inaccuracy owing to sloppy sensors that sometimes add or remove a few tenths of a percent from the reading
- Data reporting issues, such as respondents reporting random responses to survey questions in order to complete the survey faster.
- Errors resulting from improper data recording, such as missing, null, truncated, poorly coded, or corrupted values.

Overfitting is an issue that arises from attempting to predict data noise. Because noise is inexplicable by definition, trying to explain it will lead to incorrect conclusions that are difficult to apply to other situations.

Unsupervised machine learning applications

The following are some examples of unsupervised machine learning applications:

- Clustering divides the dataset into groups based on shared characteristics.
- Anomaly detection may help you find out whether there are any strange data points in your collection. It's helpful for detecting shady trades.
- Association mining finds groups of things in your collection that often appear together.
- For data pre-processing, latent variable models are often employed. Reducing the amount of characteristics in a dataset or breaking it down into numerous components are examples.

USING R FOR MACHINE LEARNING

Several of the machine learning algorithms required by R are not included in the basic installation. A wide community of professionals contributed to the program and added the algorithms required for machine learning to basic R. A package is a set of R functions that may be shared among users. For each of the machine learning methods discussed in this book, there are free packages available. In reality, just a tiny fraction of the most popular machine learning tools is covered in this book.

In this work, we provide an approach that builds a resilient random forest classifier with optimum parameters before selecting the smallest number of genes with the highest accuracy in response prediction. We analyze the impact of various parameters on the random forest error rate and propose a technique to choose the optimal parameters in order to build a stable classifier. We find a list of predictive genes using the best parameters. We propose a new clustering-based gene selection approach that ranks genes by frequency to pick the smallest number of genes from this collection. The frequency ranking method guarantees that chosen genes are consistently significant in prediction, while the clustering method picks a limited group of uncorrelated and non-redundant genes with good prediction capacity. The diversity of the best predictive gene lists has already been observed and proven to be dependent on the training set. Despite this heterogeneity, various top gene sets perform well on different sample sets, according to research. To capture this diversity, we utilize random sampling of the RF to find all of the strongest predicting genes.

We tested our method on a collection of 46 Rheumatoid Arthritis patients' whole blood gene expression patterns. Before starting anti-TNF treatment with one of the three authorized drugs: etaneracept, inflixmab, or adalimumab, blood was taken from the patients. After three months of treatment, the patients' reaction to therapy was evaluated. The CRF method found an eight-gene signature before treatment that accurately predicts therapeutic response with 89 percent accuracy, and it has been reproduced with a small independent group of data. This result shows that a molecular diagnosis may be developed for use in the medical treatment of RA patients using anti-TNF therapy.

To demonstrate the broad usefulness of our technique, we used the CRF to three previously published expression data sets and compared feature selection and classification with the recursive SVM (RSVM) method. Both approaches were tested using separate testing sets of data that were not utilized in any stage of the training process or feature selection. The CRF chooses a considerably lower number of features (5-8 genes) than the RSVM (60-80 genes) in all instances, and has superior performance as assessed by the area under the receiver operating characteristic (ROC) curve in the majority of cases (AUC).

DISCUSSION

In recent years, one of the most significant issues in health and medical treatment has been the aging population in our society. Rheumatic illness is more prevalent than any other disease in an aging population, and rheumatism is a musculoskeletal discomfort that reduces patients' quality of life. In terms of quality of life, it is critical to anticipate which individuals may acquire rheumatic illnesses. Clinical data was analysed in order to predict individuals with rheumatoid arthritis in this research. In this work, we utilize machine learning to predict rheumatic illnesses utilizing four variables for rheumatic disease diagnosis, and it will aid in the prediction of rheumatic diseases in the future using artificial intelligence. Nowadays, a vast quantity of data is readily accessible. Machine learning is a subset of artificial intelligence that is used to create algorithms based on data trends and previous data connections. Machine learning is utilized in a variety of areas, including bioinformatics, intrusion detection, information retrieval, gaming, marketing, virus detection, and picture deconvolution.

CONCLUSION

ML algorithms can handle a wide range of data configurations, define context weighting, and discover useful patterns that allow subgrouping or predictive modelling from every interaction of variables accessible for the evaluation of diagnostic and prognostic components. First, machine learning only works if the training data is indicative of the issue to be addressed, contains relevant features, and is large enough to train the model in question. For both technical and practical reasons, this may be difficult to accomplish. Second, in the gathering of sensitive clinical data, privacy is a significant issue, which may restrict the aggregation of all required data. Furthermore, some data is costly to collect, is presented in a variety of forms, and was acquired using a variety of techniques and technologies. Third, professional human judgment is required to evaluate the data, identify any mistakes or issues, and assess the clinical relevance of any results since text-based medical records may be incoherent, distracting, and include technological faults. Finally, agreement on how to integrate and coordinate ML findings with already defined guidelines or recommendations based on conventional statistics should be achieved. A research to predict individuals with rheumatoid arthritis in this study. Rheumatoid arthritis is a disease that has a significant impact on the quality of life of patients in an aging society. However, if the findings of this research can be used to anticipate the onset of rheumatoid arthritis, the quality of life may be improved.

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SUGARCANE VINASSE BIOGAS GENERATION: AN EVALUATION

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ABSTRACT

Vinasse is regarded as the most significant source of contamination in the sugarcane ethanol business. Vinasse may be used to make fertilizer, although it is deficient in macronutrients and micronutrients. It is, on the other hand, one of the resources with a high biogas generation potential. Vinasse biogas generation offers both economic and environmental advantages. However, since vinasse has a poor carbon-to-nitrogen ratio, it should be supplemented with complimentary materials such as animal manure, organic industrial waste, and lime fertilizers to increase biogas production. Currently, the globe produces 22.4 gigalitres of vinasse, which has the capacity to generate 407.68 gigalitres of biogas. This potential may be thought of as a major renewable energy source. This article provides an overview of the characteristics of vinasse as well as the generation of biogas from it. In addition, a discussion of the best circumstances for biogas production, biogas potential, and the benefits of biogas generation from vinasse is given.

KEYWORDS: *Anaerobic Digestion, Biogas, Methane, Sugarcane, Vinasse*

INTRODUCTION

Fossil fuel energy use 80% of needed energy: environmental degradation and a rising acceleration in the depletion of energy supplies. As a result, finding clean and renewable energy sources is at the top of the global agenda. Biomass is a significant renewable resource that may be used to replace fossil fuels throughout the globe[1]. When compared to other renewable sources such as hydro, solar, and wind, one of the major benefits of energy generation from biomass, such as conversion to biogas, is the lower capital investment required.Biogas generation from organic waste offers many benefits over other options such as incineration, bio-

oil, and other biological products (such as bioethanol, bio butanol, and bio hydrogen, electricity, and biodiesel in this line. Among the benefits are higher energy yields, lower environmental effects, and lower capital investment needs. When the concentration of bio methane in biogas exceeds 40%, it becomes a flammable combination. It is made via a four-stage process utilizing a microbial consortium comprising several bacteria, including hydrolysis, acetogenesis, acetogenesis, and methanogenesis[2]. Clostridium, Cellulomonas, Bacillus, Thermomonospora. Methanogenesis is controlled by a variety of archaebacterial, including Methanococcus, Methanosarcina, and Methanolobus.

For optimum biogas generation, this microbial consortium requires particular parameters, such as a pH of 6–7.5 and a temperature of 35–55 °C. Lignocellulose wastes, household and urban wastewater, and industrial wastewater are the three main sources of biogas. Agro-industrial wastes have a significant potential to pollute the environment due to their global bulk. If these leftovers are released into the environment without being properly disposed of, they may cause pollution and have negative consequences[3]. These untreated wastes contribute to climate change by increasing the amount of greenhouse gases released. The high chemical oxygen demand (COD) of these untreated wastes also provides ideal circumstances for pathogenic fungus and bacteria to thrive. Due to the presence of suspended particles, ionic matter, color, and odor, dumping industrial wastewater in nature has a variety of detrimental impacts on the ecosystem. The organic content of this effluent may be substantially reduced by aerobic or anaerobic treatment. To breakdown soluble organic material, most industrial wastewater treatment facilities utilize anaerobic digestion. The generation of bioethanol from sugarcane is one of the greatest options for replacing fossil fuels[4]. Still, one of the issues associated with bioethanol production is the treatment of vinasse wastewater. Biogas produced from sugarcane wastes offers a large potential for energy generation. Biogas generation is a straightforward technique for reducing pollution, supplying bio fertilizer, and generating a clean and inexpensive fuel. Sugar crops (e.g., sugar cane, molasses, sweet sorghum, and grapes), starch crops (e.g., corn, wheat, rice, cassava, and barley), tuber crops (e.g. potato and cassava), dairy products, and cellulose materials (e.g., rice straw, bagasse, wood, and municipal solid waste) can all be used to make bioethanol.

Agricultural leftovers and industrial byproducts are the two major kinds of waste generated during the manufacture of sugar and bioethanol from sugarcane. The former is made up of sugarcane that has been burnt or crushed during the harvesting process[5]. Ash, bagasse, filter cake, molasses, and vinasse are the five kinds of waste as well as the primary product. Vinasse is the most contamination-prone of these wastes in bioethanol production. After alcohol synthesis, an estimated 88 percent of molasses is excreted. Due to the sensitivity of alcohol-producing yeasts to concentrations of more than 9–11 percent alcohol, a lot of water is required to dilute alcohol, which results in a lot of effluent. A fermentation procedure at the maximum concentration of the original sugar may be used to minimize the huge quantity of effluent. This may be accomplished by employing yeasts that can withstand high alcohol concentrations. Some of the output effluents are returned to dilute the molasses in order to accomplish this goal[6]. This procedure may handle up to 20% of the return flow, but if done too often, the quality of the molasses would suffer. According to a study of the literature, vinasse is the most common source of contamination in the production of bioethanol, and its conversion to biogas may minimize contamination while generating clean and cheap biofuel. This article examines the production of vinasse, its characteristics, and the biogas process's generation from vinasse, as well as its benefits.

Beet, sugarcane, sweet sorghum, grape, and agave soluble solids are used to make vinasse. The characteristics of vinasse are mostly determined by the raw materials used and the circumstances under which the alcohol is produced. The kind of molasses utilized, the method of fermentation

and distillation employed, and the variety and maturity of sugarcane all influence the uniqueness of sugarcane-based vinasse. Sugarcane vinasse has a greater COD than vinasse made from other sources including sugar beet, sweet sorghum, grapes, and agave.Most, stillage, thin stillage, distillery wastewater, distillery spent wash, and distillery slope are some of the names given to it [7]. It is a liquid generated in the rectification and distillation unit of the bioethanol manufacturing process, which is shown. Vinasse makes up 80% of the raw materials needed in the production of alcohol. Vinasse is produced at a rate of 8–20 L per liter of ethanol in a conventional alcohol plant. Brazil generates half of the world's total sugarcane-based bioethanol. Brazil, India, China, Thailand, Pakistan, Mexico, Colombia, Indonesia, the Philippines, and the United States are the world's top sugarcane growers, contributing 739.000, 341.200, 124.500, 100.100, 63.800, 61.200, 34.900, 33.700, 31.900, and 27.900 Mt per year, respectively[8]. 38.1, 17.3, 6.1, 4.3, 3.2, 2.8, 1.8, 1.3, 1.1, and 1.4 percent, respectively. The majority of bioethanol made from sugarcane is generated in Asia and South America. Africa, Asia, Central America, and South America produce approximately 0.23, 0.82, 0.18, and 0.37 gig liters of bioethanol annually, respectively. Bioethanol is generated at a global rate of 1.6 gig liters per year, resulting in 22.4 gig liters of vinasse. From 25 billion liters of bioethanol, Brazil generated 325 billion liters of vinasse in 2009. In 2019, 588 billion liters of vinasse are expected to be produced in Brazil. Vinasse is a tough and abrasive effluent produced from ethanoic distillation at temperatures ranging from 65 to 107 °C and pH levels of 3 to. The temperature of the distillation column is mostly determined by the technology employed, which is primarily Barbet and Other systems[9]. These commercial operations may be carried out under vacuum pressure at a low temperature of 65 °C, while atmospheric distillation requires a high temperature of 107 °C. The pH is also influenced by the circumstances of cane growth and processing. The decrease of the vinasse pH may potentially be due to ethanoic fermentation contamination by acid-forming bacteria.Phytotoxic, antibacterial, and recalcitrant chemicals such as phenols, polyphenols, and heavy metals are also found in vinasse[10].

DISCUSSION ON BIOGAS PRODUCTION FROM SUGARCANE

Vinasse is composed of 93–97% water, 5% organic matter (sugars and carbs), and 2% inorganic insoluble particles. It has a high water solubility. Sugarcane molasses contains 2% dark brown pigments called melanoidins, phenolic chemicals (tannic and humid acids), caramels, and furfurals, which stain vinasse and inhibit microbial development. Organic matter makes up around 75% of the solids in vinasse. Calcium hydroxide may be used to decrease the quantity of volatile solids in vinasse. Vinasse has the following density, viscosity, conductivity, boiling point, specific heat capacity, and thermal value: 1.031 kg/L, 0.00138 Pa s, 16.4 dS/m, 100.25 °C, 0.934 Cal/g.C, and 3.39 Cal/g. Vinasse is a mixture of organic matter and solid minerals that results from the distillation of alcohol and contains some residual sugars, alcohol, and non-volatile chemicals. Organic matter, which includes non-fermentable substances in molasses such as sugars (glucose and fructose), fermented products that cannot be separated during distillation (glycerol and organic acids), and yeast residue that cannot be separated through the industrial process, are the major components in vinasse. Alcohols, aldehydes, ketones, esters, acids, and sugars are among the organic substances found in vinasse. Potassium, calcium, and sulfate ions, dead yeast cells, minerals from microorganism metabolic processes, alcohol and residual sugar, insoluble mineral compounds, and mineral volatile compounds are the most common mineral compounds.Propionic acid is one of the volatile fatty acids present in vinasse, which microorganisms degrade rapidly. Potassium (due to potassium in molasses has the greatest concentration among the vinasse macronutrients, followed by sulfur, magnesium, nitrogen, calcium, and phosphorus. The macronutrients, such as magnesium for clarity and calcium for carbonation, are mostly added during the sugar manufacturing process. Iron has the greatest concentration of vinasse micronutrients, followed by manganese, zinc, and copper at lesser

amounts. Vinasse includes significant quantities of sulfate due to the use of sulfuric acid to decrease pH during fermentation and yeast formation. Vinasse has 4–10 times more sulfur than the optimal concentration for biogas generation.

Due to the production of H2S, such high sulfur levels resulted in the stoppage of digestion. High H2S concertation has a detrimental impact on biogas production by disrupting methanogenic bacteria, competing with methanogenesis for sulfate reduction, and limiting trace element bioavailability. As a result, lowering H2S generation should be addressed in order to enhance biogas output. Heavy metals, including as chromium, copper, nickel, and zinc, are also found in vinasse, which are produced during the molasses processing. Sugarcane molasses vinasse has more sulfate, potassium, and iron than other vinasse sources. The chemical components of sugarcane vinasse from various nations are given. Coccus, Curve rod, Filament, Methanosat, Methanosarcina, Fluorescent rods, and S. cerevisiae are among the bacteria identified in vinasse, with the last two being methanogenic microorganisms.According to vinasse genotyping experiment, methanobacteriales and methanosarcinales are the best methanogenic microbes for producing methane from vinasse under optimal circumstances in a modified UASB reactor. They are more active and adaptive in vinasse-rich environments. In contrast to Methanosarcina, Methanothrix, being a methanogenic bacterium, is more sensitive to poisonous chemicals found in vinasse. The development of Methanosarcina is caused by the presence of magnesium and calcium ions in vinasse. Magnesium and calcium are two substances that are required for all microbial development. Magnesium, calcium, and substrate concentrations all influence the shape of methanosarcina. These variables allowed for morphological modification and interconversions between pseudosarcinal aggregates and individual coccoid cells. The impact of calcium and magnesium on methanosarcina development was studied. Adding 0.5 g of CaCl2.2H2O and MgCl2.6H2O per liter resulted in a three-fold rise in methanosarcina concentration, according to the findings.

Bioethanol manufacturing facilities are one of 17 industries that pollute the environment severely. Vinasse produces greenhouse gases such as CH4, N2O, and CO2, with methane accounting for 99.8% of the total. These gases create a number of issues, in addition to global warming caused by changes in the environment's chemical and physicochemical characteristics. Adding heavy metals to the soil, such as lead, zinc, and copper, increasing electrical conductivity and total dissolved solids, and decreasing plant germination (negative impact on microbial activity are other issues. Furthermore, when vinasse is released into the environment, it causes toxicity in surface and underground water due to high concentrations of solids and hard constituents such as phenols and polyphenols (8000-10,000 mg/L), corrosive organic matter content of indole 3-methylindoleand increased eutrophication due to high nitrogen and phosphorus content. Vinasse colored compounds reduce sunlight permeability in rivers and lakes, reducing photosynthetic activity and dissolved oxygen concentration (due to high temperature of vinasse) in water, resulting in hazardous conditions for aquatic life and disruption of plant and aquatic animal life due to reduced photosynthesis. Many fish are killed by the “cowshed-fly” Stomoxyscalcitrans as a consequence of the widespread use of vinasse in fields and its penetration into groundwater. Vinasse is also poisonous due to its low pH and metal content. It's 100 times more toxic than sewage from homes. Vinasse may be kept at temperatures below 4 °C to minimize microbial activity.

On vinasse, an Allium cepa test revealed no germination potential. Vinasse has been shown to have a 50% cytotoxic. When it comes to vinasse storage, the methane release rate in open channels is 1.36 kg CO2eq m3, which is 620 times higher than in closed reservoirs or settings. This is owing to the difficulty of fermenting it in the confined reservoirs. Because of the pollution and strong odor caused by vinasse decomposition, it should be disposed of outside of inhabited regions. Vinasse's darkness creates a filthy, immature atmosphere. Humans dislike the

odor of vinasse, and its presence in drinking water causes an epidemic of malaria, and schistosomiasis. Meloidogynejavanica, M. incognita, and Drosophila melanogaster worm eggs may grow in it. Each liter of vinasse pollutes the environment in the same way as 1.43 people pollute the environment. Vinasse is used in the chemical industry to make organic acids, Bacillus subtilis surfactants, and amino acids, among other things. 150m3/ha vinasse equals 61 kg/ha nitrogen, 40 kg/ha phosphorus, 343 kg/ha potassium, 108 kg/ha calcium, and 80 kg/ha sulfur. Vinasse is also used to make hydroponic culture, protein, and material compost as a fuel, having a thermal value of 12560–15070 kJ/kg. Vinasse is utilized in civil construction and cattle and poultry feed (because to its high nutritional content), as well as source materials for bacteria and fungi to produce lipids and road folding and mulching.They are more active and adaptive in vinasse-rich environments. In contrast to Methanosarcina, Methanothrix, being a methanogenic bacterium, is more sensitive to poisonous chemicals found in vinasse.

The development of Methanosarcina is caused by the presence of magnesium and calcium ions in vinasse. Magnesium and calcium are two substances that are required for all microbial development. The shape of methanosarcina is influenced by magnesium, calcium, and substrate concentrations. These variables allowed for morphological modification as well as interconversions between pseudosarcinal aggregates and individual coccoid cells. It can also be used to produce single-cell protein and calcium-magnesium acetate for the production of various bio-products (e.g., enzymes, chitosan, astaxanthin, planthormones, biopolymers, alternan, pullulan), algal production (e.g., Chlorella vulgaris and Neochlorisoleoabundans, and yeast production that requires high energy and the addition of ammonium and magnesium vinasse does not meet the requirements for direct use in soil. one of the most frequently utilized techniques. In addition to reducing COD and total organic carbon (TOC), the ozone pre-process and UV light may increase 20 percent of generated methane and reduce phenolic chemicals and color. At normal circumstances, the ozone preprocess may decrease phenolic compounds by 65% and color combinations by 80%, raise methane gas from 250 to 284 ml/gCOD, and reduce COD removal by 79 to 81 percent. The methane generation in AD treatment was 0.315 m3CH4/kgCOD, with a COD removal efficiency of 75.1 percent, according to a test conducted at mesophilic temperature to assess the effectiveness of treating vinasse using anaerobic digestion (AD) followed by ozonation. In a bubbling column, the anaerobically digested effluent was further treated with ozone. COD removal efficiency was 99.2 percent with 100 mgO3/L, whereas color removal efficiency was 99.3 percent. The AD process was carried out in a laboratory-scale upflow anaerobic filter reactor (UAFR) that ran continuously at 29 degrees Celsius. At 10 kgCOD/m3.day and a 5-day HRT, stable conditions were achieved. Evaporation can concentrate vinasse, which may subsequently be utilized to generate energy in boilers. Although this technique is utilized in Iran, it is not used to generate electricity. Furthermore, coagulation-flocculation, electrocoagulation, and ultra-sonication have all been employed to cure vinasse, all of which demand a lot of energy.

Bioprocessing, advanced oxidative processes, AD, and chemical-based procedures are all examples of vinasse treatment techniques. Oxidation and chemical reactions, AD, and microbial fermentation are among the techniques that are efficient in reducing the organic and mineral load. Wind and sun radiation evaporate the water from vinasse in fermented lagoons, and the sludge is discharged, resulting in greenhouse gas emissions and environmental pollution. In contrast to certain nations, such as Brazil, some countries, like as Iran, do not utilize vinasse as a fertilizer in their fields due to soil salinity. Anaerobic digestion has been proposed as a biodegradation technique for handling organic wastes on a wide scale. The goal of anaerobic digestion is to turn trash into two types of useful and necessary materials: biogas and high-quality crop fertilizer. This procedure is carried out by a symbiotic community of microorganisms. Methane, carbon dioxide, ammonia, water, and bacterial cells are all examples

of complex organic molecules that are physiologically transformed to a variety of chemicals. When compared to aerobic digestion, it generates 10% less sludge. Vinasse has a strong anaerobic digestion capability. Vinasse anaerobic digestion may be used to stabilize organic waste and generate biogas as well as the energy required to dry yeast at the facility or distill ethanol. Sulfate and the majority of organic debris are eliminated during anaerobic digestion of vinasse, while numerous organic volatile chemicals and minerals potassium, nitrogen, and phosphorus are separated. Anaerobic digestion has been proposed as a biodegradation technique for handling organic wastes on a wide scale. The goal of anaerobic digestion is to transform trash into two types of useful and necessary materials: biogas and high-quality crop fertilizer. This procedure is carried out by a symbiotic community of microorganisms. Methane, carbon dioxide, ammonia, water, and bacterial cells are all examples of complex organic molecules that are physiologically transformed to a variety of chemicals. When compared to aerobic digestion, it generates 10% less sludge. Vinasse has a strong anaerobic digestion capability.

CONCLUSION AND IMPLICATION

The characteristics, significance, and environmental effects of vinasse, as well as its treatment using anaerobic digestion to produce biogas, are discussed in this article. Vinasse, a liquid byproduct of the rectification and distillation of bioethanol from sugarcane, is one of the world's biggest sources of industrial effluent. Anaerobic digestion is one of the most efficient and promising methods for reducing vinasse's harmful environmental impacts. Vinasse, on the other hand, cannot be effectively converted to biogas as a single substrate because it lacks sufficient macronutrients and micronutrients and has a poor carbon-to-nitrogen ratio.As a result, co-digestion should be used to compensate for vinasse's nutritional and carbon to nitrogen ratio deficiencies.

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THE DETERMINATION OF CONDENSATION PRECIPITATION ON THE INNER SURFACES OF THE LIMITATION DURING THE ACTION OF AEROSOLS

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ABSTRACT

Determination of the fallout of condensate on the inner surface of the fence when exposed to aerosols. Aerosols present in the production environment significantly affect the change in relative humidity and condensation on the inner surface of the fences and their effect must be taken into account in the calculations.

KEYWORDS:*Changing Temperatures, Humidity Regime, Moisturizing The Enclosing Structures, Saline Material, And Capillary Condensation.*

INTRODUCTION

In industrial buildings with aggressive environments, external walls are used in qualitatively different conditions compared to walls that are only influenced by moisture and temperature gradients.

In accordance with building codes and regulations, industrial premises of most modern chemical factories can be classified as premises with normal or even dry temperature and humidity conditions. Numerous field studies of the temperature and humidity regime of the air at potash plants confirm this statement [1-5].

However, in many cases, the walls of such buildings are covered with efflorescence and wet spots, which indicates an unfavourable humidity regime. Analysis of samples taken by the thickness of the clay brick walls shows that in some buildings the average humidity at the end of the moisture accumulation period exceeds the allowable 5%, and the local maximum humidity is higher. In the warm season, the walls do not have time to dry out. A similar picture is observed in walls made of expanded clay concrete panels with a protective layer of heavy concrete [7-12].

MATERIALS AND METHODS

The increased humidity of structures in the presence of salts leads to the destruction of the wall material, especially from the outer surface, which is exposed to sharply changing temperatures. In addition, the concentration of salt dust in the outdoor air often exceeds the concentration of dust in the indoor air [13-19]. The degree of salinity, the design of the wall and some other factors affect the process of moisturizing the enclosing structures and the nature of the distribution of moisture along with the thickness of the wall. However, with the correct choice of the structural solution of the wall, the decisive influence of the salt solutions contained in the thickness of the fence on the humidity regime is undoubted, since in the pores of the wall material there are solutions of salts with physicochemical properties that differ from water.

The presence of chloride salts in the thickness of the fence increases the hygroscopicity of materials (the ability to absorb moisture from the air) [20-27]. The sorption properties of building materials are determined by the nature of the connection between moisture and the surface of pores and capillaries. The amount of adsorbed moisture in the presence of salts will depend not only on the temperature and humidity conditions of the environment and the nature of the material to be moistened but also on the physicochemical properties of salts and their amount in the pores of the material. In small pores of saline material, capillary condensation occurs when the relative humidity of the air is much lower, depending on the chemical composition of the salt and the concentration of the solution. Determination of the duration of exposure to condensate caused by aerosol hygroscopicity can be considered by the example of assessing the inner surface of the enclosing structure in buildings with aggressive environments.

The calculation of the time during which during the cold period of the year condensation will fall on the inner surface of the fences is based on the determination of the dew point temperature. The result of the calculation can serve as an approximate estimate of the time of exposure of the liquid phase to the protective coating of the fence from the inside since it is made with the following assumptions: when determining the outside air temperature, which causes condensation on the inner surface of the wall, it is assumed that the temperature of the inner surface of the wall changes instantly after the change in the outside air temperature, i.e., the thermal inertia of the wall is not taken into account. The assumption made leads to an inaccuracy in the estimate of the total time of condensate precipitation in comparison with the actual values in the direction of increase [28-34].

The total time of exposure to the liquid phase during the cold period of the year on the protective coating is determined, without taking into account periodic increases in the outside air temperature and corresponding to the increase in the temperature of the inner surface of the wall, causing interruptions in condensation, which has a positive effect on the service life of the protective coatings. Consequently, the frequency of condensation is taken into account only in the annual cycle of changes in the outdoor temperature.

The thermal engineering calculation of the fence is carried out following the chapter of SNiP on construction heat engineering. It is desirable to take real values obtained based on field studies as parameters of the internal air (temperature, humidity and aerosol properties). In the presence of hygroscopic aerosols in the air of the industrial premises, the nominal relative humidity of the air, determined by the formula

$$\varphi_y = \frac{\varphi_в}{\varphi_г} 100\%,$$

Where $\varphi_в$ - is the relative humidity in the room,%;

$\varphi_г$ -Hygroscopicity of aerosol,%;

Depending on the temperature of the indoor air tв and the relative humidity of the indoor air, the absolute relative humidity of the air and the relative temperature of the dew point are determined. according to tables of values of maximum vapour pressure. The maximum outside air temperature at which condensate will fall out on the inner surface of the fence, under stationary heat transfer conditions and the above assumptions, can be determined by the formula

$$t_H \le t_в - \frac{t_в - \tau_{ру}}{R_в} R_0$$

wheretB - indoor air temperature, ℃

$\tau_{ру}$ -conditional dew point temperature of the inner surface of fences, ℃

$R_в$– heat resistance$м^2$.ч. ℃/ kcal

The time in hours during which condensation will fall on the inner surface of the fence can be determined from the data of the SNiP chapter on construction climatology and geophysics.

RESULTS

Thus, it has been shown that aerosols present in the production environment significantly affect the change in relative humidity and condensation on the inner surface of the fences and their effect must be taken into account in the calculations. The studies carried out have established that the calculation of the time during which condensation will fall on the inner surface of the fences during the cold period of the year should be based on determining the dew point temperature, taking into account the assumptions of not taking into account the thermal inertia of the wall and the frequency of condensation.

How to care for concrete in the summer. If you decide to concrete any structural element in the summer, then you should understand that in summer there is high temperature and low humidity. That is why in the summertime the concreted area is covered with burlap and periodically moistened by pouring water every 2-3 hours. If the weather is not very hot, then it is worth watering every 10-12 hours. It is necessary to water the concrete within three days. This concrete care is needed in order to avoid the evaporation of water in the concrete solution itself since, without water, concrete will crack and corrode. In a humid environment, concrete gains greater strength.

How to care for concrete in winter. At a temperature of + 5-10 degrees, the hardening of concrete is significantly reduced. And at temperatures below 0, it stops. Therefore, there are three ways to heat concrete in winter. The first of these is the "thermos method". The concrete is covered with a film, and steam or warm air is allowed under this film. Because of what the concrete heats up and becomes a humid climate, which favourably affects the conditions for its freezing. The next method is "electrical heat treatment", that is, electrodes are inserted into the concrete around the perimeter and closed in one circuit, after which a current is started. And the most common way is the third - the introduction of chemical additives into concrete. There are various chemical additives that "make" the concrete mixture harden. The most common additives are calcium chloride and sodium chloride, sodium nitrate and urea. All supplements can be purchased at any hardware store.

CONCLUSION

How to choose heavy concrete. If your structure or structure is located in a humid area or a humid environment, corrosion-resistant heavy concrete should be used. So you need to cover the concreted place with dense ceramic tiles or process it with liquid glass, for complete confidence that the concrete will not corrode. If your structure or structure will be located in a room or area

with a high temperature, you should use heat-resistant heavy concrete. It is also worth revealing it with ceramics or heat-resistant materials.

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THE USE OF INEXPENSIVE NON-WOVEN MATERIALS AS THERMAL INSULATORS IN THE INSTALLATION OF FLOOR HEATING UNITS

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ABSTRACT

The article describes measures to replace foamed foam insulation, which is used as a thermal insulator in the construction and installation of "warm floors" for heating rooms, with non-woven materials obtained from relatively inexpensive fabric waste. In the construction of "warm floors" for heating houses in the cold season, during their installation, under the pipes are insulated with aluminium foil on the paralon to insulate from the heat. At market prices, such bedding costs $ 1.2-1.4 per square meter.

KEYWORDS:*Nonwovens, Yarns, Fabrics, Knitwear, Fabric, Fabric, Felt, Fibre Mats, Glued Fabrics, Technology, Mechanical Technology, Physicochemical Technology, "Warm Floor".*

INTRODUCTION

In the construction of "warm floors" for heating houses in the cold season, during their installation, under the pipes are insulated with aluminium foil on the paralon to insulate from the heat. At market prices, such bedding costs $ 1.2-1.4 per square meter.

The main function of these linings is to prevent the hot water energy moving in the pipe from passing to the bottom of the concrete floor, which saves on the cost of heating the room. These mats are mainly made of artificial password material [1-7].

Typically, these floors are covered with heating pipes and covered with a 7-8 cm layer of concrete. Such insulation coatings are not subject to any mechanical effects, ie they remain between the concrete floor. Therefore, it would be appropriate to replace these beds with relatively inexpensive rock beds from waste recycling [8-11]. For this purpose, we recommend recycling artificial and synthetic fabrics from clothing and using them as insulation.

MATERIALS AND METHODS

Non-woven fabrics are already being developed using various technological methods.

Many types of nonwovens are made from fibre mats. The properties and quality of fabrics depend on the properties, physical and mechanical properties and composition of the raw materials that make up this carpet.

The bedding we want to recommend is crushed on special machines before being made and shaped into fibres

Typically, non-woven fabrics are made by mixing several types of fibres of different qualities. Fibres with different properties should be mixed well so that they are evenly distributed in the fabric [12-18].

For maximum purification and mixing, the fibres should be separated into small groups. The process of making the fibres like this is called titration. From the above considerations, it is clear that the process of grinding, cleaning, mixing must be repeated in a certain sequence and continue uninterrupted.

The processing of man-made fibres consists mainly of grinding and mixing processes. They have few defects and do not require special cleaning. The processing technology is organized according to the type and linear density of the fibre. Coarse chemical fibres are made in wool processing equipment. Fine chemical fibres (100-200 m_{tex}) can be made in cotton fibre grinding equipment. Synthetic fibres require faster vibration than synthetic fibres. In the manufacture of fabrics from a mixture of several types of fibres, they must be cleaned and blended before mixing until the volume density is uniform. The fibres are redistributed evenly so that they are evenly redistributed in the mixture, ie the proportion of each type of fibre in an arbitrary surface or volume corresponds to the specified norm. no matter what product is produced. The splitting process is done to break up the fibres into smaller pieces.

The fibres are crushed by pinching or by repeatedly hitting the layer hard. Pinching is done using pegs, needles or gears with a toothed surface. In this method, the fibres are divided into sections by unilateral or simultaneous bilateral action.

Strong and repeated blows to the fibres are also referred to as beating. In this method, the fibre layer is pulverized by beating with a beating drum with a knife. Free-kicking of fibres is also used. The essence of the process is to break up large pieces into smaller pieces.

Grinding is done on grinding machines. The main drum and rollers of the machines are mounted on the surface of the rollers with bent ends. The coupling is carried out first with the head drum holding the tuft held by the supply cylinders, and then between the drum and the working pair (Fig. 1).

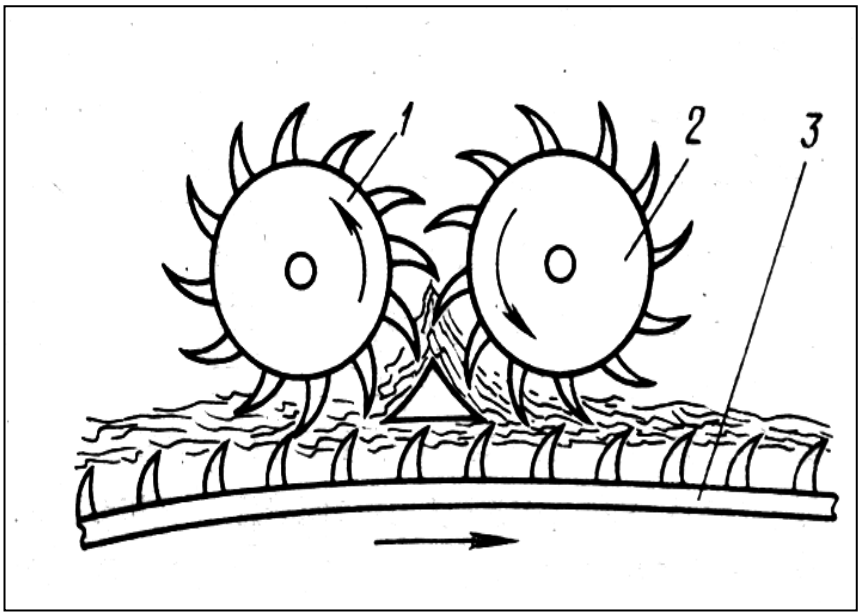

Figure 1 Tightening with working rollers

The fibres in the 3 teeth of the drum are crushed by the relatively slow rotating roller 1 and broken into small pieces. The fibres picked up by the working roller are separated by the cleaning roller 2 with the pegs facing in the opposite direction and transferred back to the main drum. The distance between the drum and the rollers is negative, ie the pins of the rollers are between the pins of the drum [1].

The essence of the mixing process is to evenly distribute the fibres of each type and with different properties in the resulting semi-finished product. There are random and orderly distribution methods for mixing fibres, which are also referred to as unorganized and organized methods, respectively.

Use the soaking method we recommend to create the mattress

The purpose of the impregnation process is to insert the liquid binder into the bed so that the fibres are evenly distributed. As a result of soaking, the mass of the fibre bed increases due to the binding glue [3].

Here's how to put one together for use with your non-woven fabric. In this case, as usual, the pieces of fabric are crushed in a shredder. The resulting product is spread on a scraper to form a paste. The resulting bedding is transferred to a belt conveyor. Before that, a piece of foil equal to the width of the drop from the roll is written on the conveyor. This fortune-telling is covered with a sheet of paper. The speed of the belt conveyor must be equal to the speed of the bed.

The bed continues to move on the conveyor belt, which is formed by recycling the waste on the falcon. Melted polymer melt or liquid bitumen is applied to the fibres from the nozzles mounted on the conveyor. The belt is then passed between the calibration drums mounted on the conveyor during the conveyor movement and pressed to the required thickness. It is then cooled in the air and rolled into a roll. The cost of this mattress is 50-60% cheaper than the password

CONCLUSION

In the cold season, instead of the foam floor used in the installation of "warm floors" for heating rooms, it is possible to achieve great economic efficiency by using non-woven fabrics, which are produced locally using fabric waste.

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AN OVERVIEW OF THE NETWORK TOPOLOGIES FOR ENTERPRISES

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ABSTRACT

This paper assesses and investigates the fundamental sorts of organization geographies which incorporate the transport, star, ring and lattice topology. This article besides examines every topology's points of interest and weaknesses when utilized. A rundown of investigation was likewise made in an even structure to gather and make it more obvious things. From that point forward, the paper talks about various circumstances where a specific topology can be used.This paper discuses about the Organizations with more resources are already able to afford the expense of the most current advances, but they may still choose for the conventional if they need it. Businesses can be categorized according to their capitalization.This kind of geography is well-liked in small businesses since it is simple to use and understand.

KEY WORDS: *Network Topologies, Wired Network, Microenterprises.*

INTRODUCTION

Nowadays, wireless connections are already utilized but it does mean that everyone is using this. There are still business entities that could not afford to use this type of systems and so they prefer to use the wired connections. Wired connections include the Local Area Network. This is a computer network that interconnects devices within a limited area such as a residence, school [1], laboratory, university campus or office building. This investigation may unquestionably profit individuals from microenterprises. Others organizations having higher measure of resources would already be able to bear the cost of the most recent innovations however they can still pick with the traditional in the event that they need businesses may be classified based on

the amount of capitalization. In the Philippine context, according to the Republic Act No. 9178, we have the following classifications shown on Table 1 [2].

TABLE 1: THE PHILIPPINE CONTEXT, ACCORDING TO THE REPUBLIC ACT NO. 9178.

Classification	Bracket
Micro	Below Php 3,000,000
Small	3,000,001 - 15,000,000
Medium	15,000,001 - 100,000,000
Large	Above 100,000,000

1.1 Network Topology Analysis:

Bus Topology:

This kind of geography is solid in little organizations and it is anything but difficult to utilize and comprehend. This additionally requires minimal measure of links to interface the PCs together and it's anything but difficult to expand [3]. In view of the way that any PC in the organization can communicate information whenever, network traffic can hinder a transport. Likewise, every association between two links can fall apart the electrical sign. In this kind of geography, the transport setup can be hard to track down and can make the entire organization quit working [4].

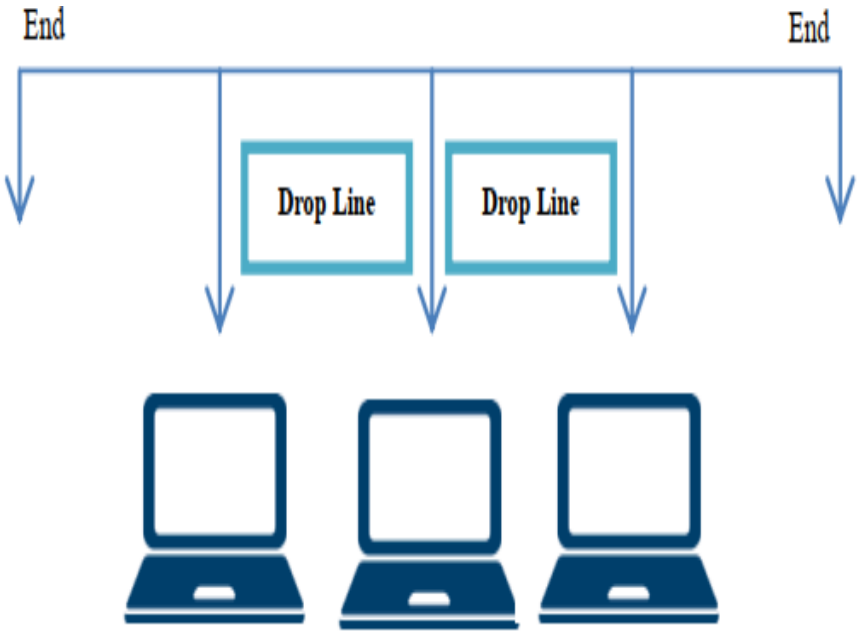

Fig 1: Bus Topology

Star Topology:

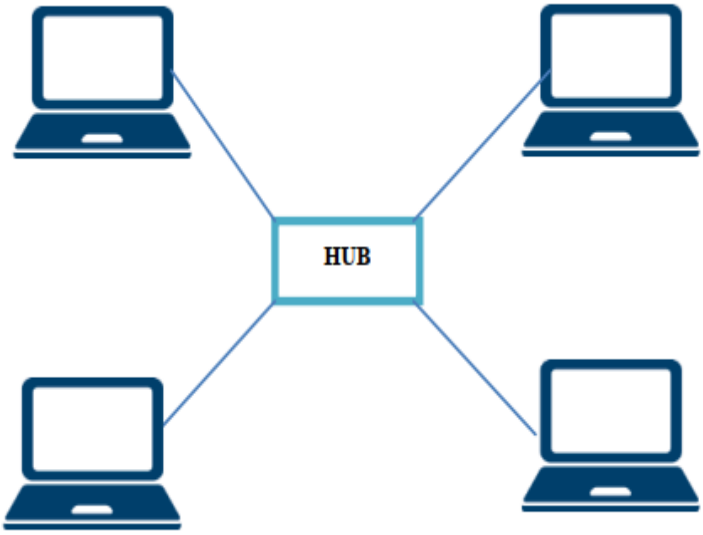

Fig 2: Star Topology [5].

In a star geography, on the off chance that one of the PCs comes up short, it doesn't influence the others and this likewise adds to its great exhibition. The focal point of a star network is a decent spot to analyze network shortcomings and on the off chance that one PC falls flat, the entire organization isn't upset. Substitution or evacuation of gadgets can be effortlessly done[6].

This kind of geography is costly to introduce as it requires more link, it costs more for all organization links should be pulled to one essential issue. This requires more link length than different sorts of systems administration geographies. Since the organization relies on the center point, or the focal hub, in the event that it neglects to work, at that point the entire organization likewise neglects to work [7].

Ring Topology:

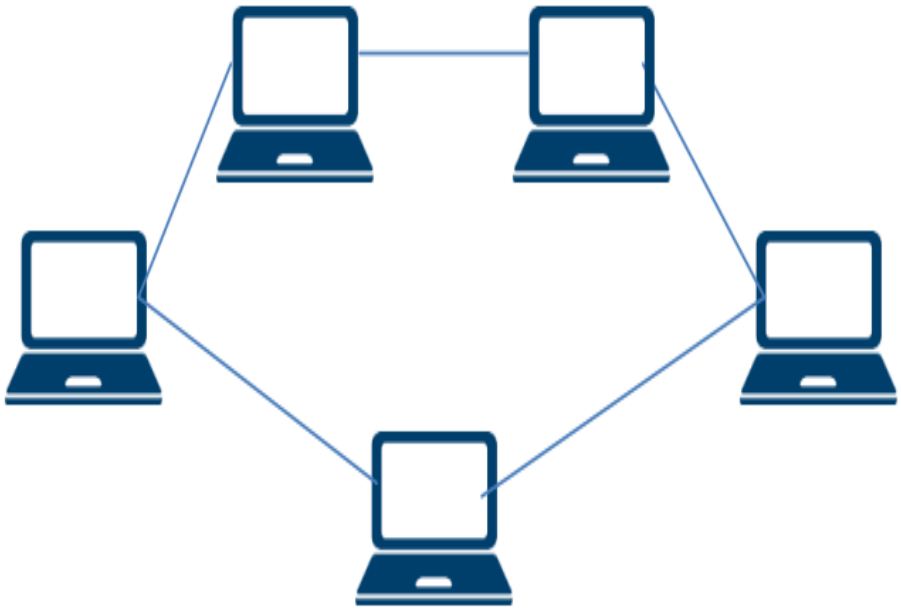

Fig: 3 Ring Topology [8].

A logical or overlay topology is created by combining the work and application layers. The underlying structure of a network affects its communication. This has an effect on protocol performance as well as routing behavior and complexity. It's crucial to choose the right topology for simulations, analytical investigations, and experimentation. Take a look at Figure 4 as an example. Both scenarios depict a local area network that links end devices to the Internet via routers, but the topological characteristics differ. As a consequence of the protocol assessment, totally different findings may be obtained. A routing protocol's failover methods,

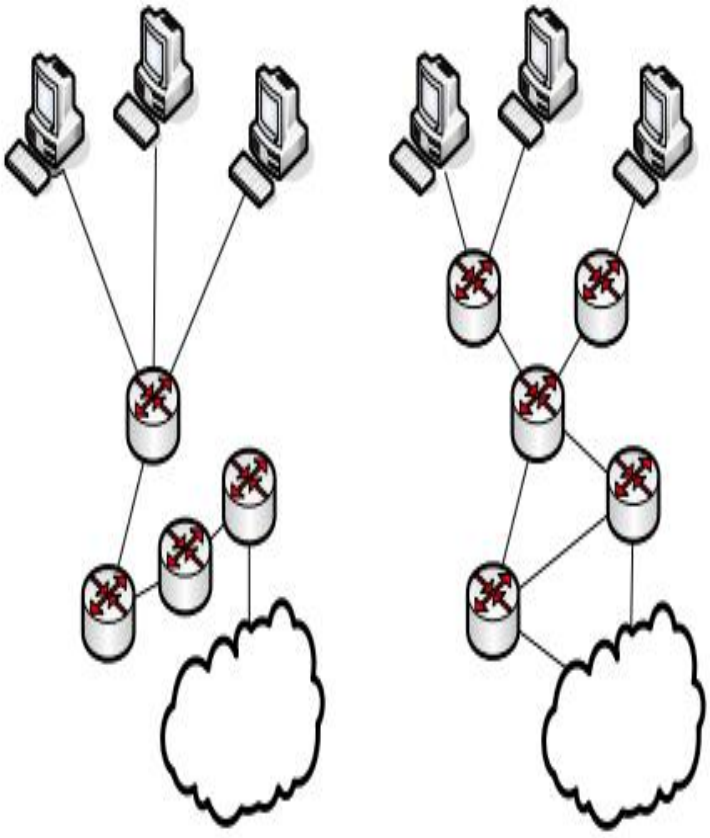

Figure 4: Non-redundant network and redundant network.

For example, cannot be monitored for a configuration. The topology of the network and its characteristics are critical components in the assessment of protocols and systems. They should be selected based on the characteristics of the issue being studied. As a result, clarifying the situation in which the protocol will function is the first step in choosing an acceptable topology. However, in many instances, the underlying network's characteristics are unclear or just loosely specified. As a result, there is a trend to use network measurement to enhance topology modeling. Working with actual data, particularly for big, dynamic networks like the Internet, has unique challenges. To begin with, retrieving actual data for such structures is a difficult job. Second, each measurement is just a snapshot in time, and it may become outdated fast. Furthermore, collections of really huge sizes may be difficult to parse with the memory and CPU cycles presently available. As a result, rather than addressing the issue to a specific network topology, the whole topology space should be investigated.

In this type of topology, the ring network offers high performance for a small number of workstations or for larger networks where each station has a similar workload. The ring networks can also span longer distances compared to other types of networks and these are also easily extendable. Unlike a bus topology, there is no signal loss in Ring topology because the tokens are data packets that are re-generated at each node. This sort of geography costs a lot of cash, time and exertion for its establishment. In the event that one PC comes up short, it can influence the entire organization and it is hard to track down flaw in the organization. The entire framework is disturbed when PCs are being added or supplanted in the organization. This is much slower than an Ethernet network under typical load.

There are many degrees of abstraction in the modeling process. The structural characteristics of a network are formed by a network topology model. Due to indication, dedicated instances of network equipment such as various kinds of routers, switches, and end system nodes are ignored. The second phase 'eliminates' and subsumes any things that are transparent to the layer under observation. We'll concentrate on the local routing structure in this case. As a result, switches will be eliminated, and end devices will be integrated into a single domain. Our network currently consists of routers, end user domains, and an inter-network link. The inter-network link as shown does not contain any further information from a structural standpoint. The last phase converts the physical network into an abstract graph (see Figure 5). Edges and vertices are represented by nodes and links, respectively.

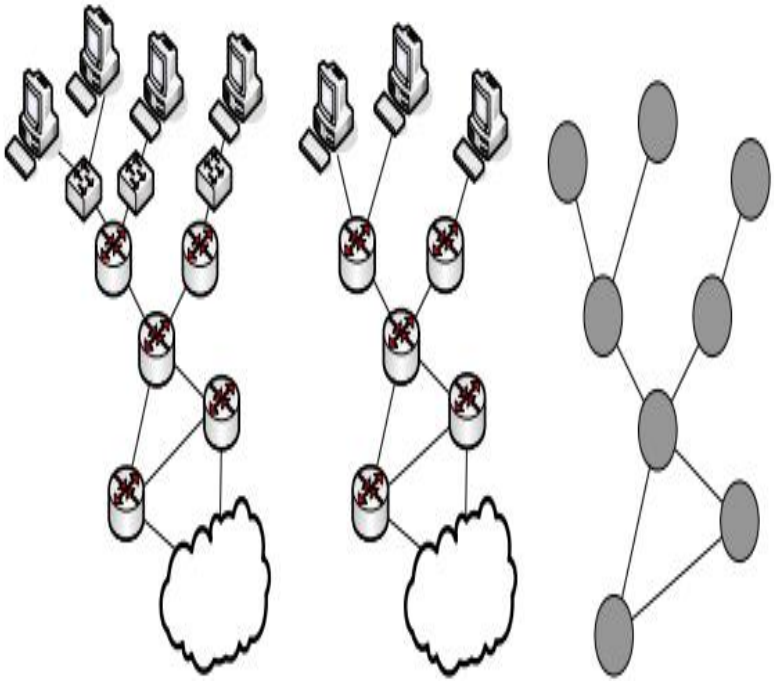

Figure 5: Redundant Network, Redundant Network and Graph Representation.

REVIEW OF LITERATURE

There have been many paper published in the field of network topology among all those paper a paper titled "A Review-Analysis of Network Topologies for Microenterprises by Francis Pol Lim discussed the network topology analysis, bus topology, advantage and disadvantages of bus topology, star and ring topology and its advantage disadvantage, mesh topology and its advantage and disadvantage, discusses the choosing network topology for business, also give block diagram and their algorithm of different topology and their usages in different application [9]. Matthias Wählisch studies Network topologies are an important component of data transmission. They explain how network elements are directly linked to one another and, as a result, how data may flow. This kind of node relationship structure may be constructed on several levels, culminating in a physical or logical structure.

Topology. The rst will be built while using a physical medium to link devices. Data interchange may be organized on top of this structure through the network and application layer, resulting in a logical or overlay topology [10].

DISCUSSION

This paper discus about the Organizations with more resources are already able to afford the expense of the most current advances, but they may still choose for the conventional if they need it. Businesses can be categorized according to their capitalization.This kind of geography is well-liked in small businesses since it is simple to use and understand. This also only requires a small number of connections to connect the PCs, and it's not difficult to scale up. Network traffic may obstruct a transport since every PC in the company can transmit information at any time. Similarly, any connection between two connections may cause the electrical indication to break down. The transportation setup may be difficult to track down in this kind of terrain, and it might cause the whole company to stop functioning. In a star geography, if one of the PCs fails, it has no effect on the others, which contributes to its impressive display. The hub of a star network is a good place to look for network flaws, because if one PC fails, the whole company isn't affected. The replacement or removal of devices is simple. For small groups of workstations or larger networks with comparable workloads, the ring network provides excellent performance. Ring

networks, in comparison to other types of networks, can span longer distances and are also easily expandable. Because the tokens are data packets that are re-generated at each node, there is no signal loss in Ring topology, unlike a bus topology. There are many degrees of abstraction in the modeling process. The structural characteristics of a network are formed by a network topology model. Due to indication, dedicated instances of network equipment such as various kinds of routers, switches, and end system nodes are ignored. The second phase 'eliminates' and subsumes any things that are transparent to the layer under observation.

CONCLUSION

The choice of LAN Network geography would rely upon numerous contemplations upon the business circumstance yet the money saving advantage rule should consistently be applied when choosing things with respect to the business. These sorts of organizations may appear conventional however it can unquestionably be used for microenterprises, other business levels can likewise use it relying upon their carefulness. The modernization of innovation may not be that pertinent to all in light of the fact that numerous imperatives might be viewed as, for example, financial plans furthermore, capacity to adjust innovation. In general, the specialist proposes further investigation of your business circumstance previously choosing what geography to utilize. Yet, in the event that that your first endeavor may not be that successful, there is consistently one more opportunity to improve it. Prior to having a stable framework, it is common that we might be in an experimentation strategy first.

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ANTIMICROBIAL FINISH ON FABRICS USING PHYTOCONSTITUENTS: A REVIEW

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ABSTRACT

The use of plant-based natural colorants and some other bioactive natural extracts in textile coatings as antimicrobial textile finishes is gaining traction. Several plant-derived natural colors have potent antibacterial effects. As a result, coating cotton textiles with antimicrobial plant natural dyes and bioactive plant extracts is a new technique in the manufacture of medical cloths. According to current research, depending on the kind of components contained in the plant extract, many plant extracts may be effective against several gram positive and gram negative bacteria. As a result, research on environmentally friendly antimicrobial compounds based on natural ingredients for use in textiles is gaining traction throughout the globe. This article presents a thorough overview of natural product-based bioactive agents for antimicrobial finishing of textile substrates, including chitosan, natural dyes, neem extract, and other herbal items. The mechanism of antibacterial activity of several types of active components identified in extracts of natural products has been described. The goal of this article is to provide the most up-to-date scientific information on the extraction and use of natural colorants in textile processing. The advantages and disadvantages of using natural colorants on textiles, as well as various techniques of extracting natural colorants, have all been addressed.

KEYWORDS:*Antimicrobial, Dyes, Fabrics, Natural, Plant.*

INTRODUCTION

Antimicrobial fabrics with enhanced functionality are used in a wide range of goods, including health and hygiene products, particularly clothing worn near to the body, and therapeutic diagnosis including infection control and barrier materials. A variety of textile products depends

on synthetic antimicrobial agents such as triclosan, metal and their salts, organometallics, phenols, quaternary ammonium compounds, and others have been developed especially in recent decades, with the rise in the amount antimicrobial fibre technologies and the growing awareness about cleaner surroundings and health promotion. Synthetic antimicrobial compounds are efficient against a wide variety of bacteria and have a long-lasting impact on textiles, but they have drawbacks in terms of side effects, nontarget microorganism activity, and water contamination. As a result, there is still a high need for antimicrobial textiles based on environmentally friendly agents that not only assist to minimize the negative effects of microbial development on textile materials, but also meet the statutory criteria set by regulatory authorities[1].

Natural ingredients such as chitosan as well as organic dyes have been extensively documented for antibacterial finishing of textile fabrics. Aloe Vera, Tea Tree oil, Eucalyptus oil, Tulsi leaf extracts, and other natural herbal products may also be utilized for this purpose, since there is a wide supply of medicinal plants with active antibacterial components. Despite the fact that many natural ingredients are rich in antimicrobial agents, research into their application in textiles is sparse and poorly documented[2].

ACCOUNT OF HISTORY

Cotton fabrics were used widely for tentage, tarpaulins, and truck coverings during World War II, and these materials needed to be protected against microbial assault. This was especially problematic during the South Pacific battles, when most of the combat occurred in jungle-like circumstances. The US army Quartermaster Crops gathered and recorded data on fungus, yeast, and algae isolated from cloth in tropical and subtropical regions throughout the globe in the early 1940s.Cotton duck, webbing, and other military materials were strengthened and scented with a combination of chlorinated waxes, copper, and antimony salts.

The US Department of Agriculture's Southern Regional Research Laboratory, the Institute of Textile Technology (ITT), and some of the ITT's member mills worked together to chemically alter cotton to enhance its resistance to rotting and other characteristics via acetylation and cyanoethylation. Because of the relatively high cost and loss of fabric strength during processing, these treatments have had limited industrial adoption. Furthermore, man-made fibres such as nylon, acrylics, and polyester, which are naturally resistant to microbial degradation, have been more widely used to replace cotton in many industrial textiles[3].

Also discussed on antibacterial finishing of cotton and cotton-polyester mix fabrics utilizing the active components of neem seed extract, a natural product. The Indian subcontinent's plentiful neem tree provides a great source of therapeutic chemicals. It has high antimicrobial potential, and its major components, such as azadirachtin, salannin, and meliantriol, have been effectively integrated to the cellulose substrate, imparting a semi-durable antibacterial activity against both Gram-positive and Gram-negative bacteria.

Figure 1: Illustrate the diagram shows the antimicrobial finish for textile

Additional elements included in textiles, such as lubricants, antistats, natural auxiliaries (sizing and thickening), and dirt, offer sustenance for bacteria. Furthermore, dirt, dust, and sweat solutes may serve as nutrition sources for bacteria. Because of their high hydrophobicity, synthetic fibres are more resistant to the development of germs than natural fibres. Under certain circumstances, the carbohydrates in cotton and the proteins in keratinous fibres may serve as a source of nutrition for bacteria. Wool is more susceptible to bacterial assault than cotton, while cotton is more susceptible to fungal attack (Schindler and Hauser, 2004). As illustrated in Figure 1, the development of microbes on textiles causes unpleasant odors, fabric discoloration, and a decrease in fabric strength and other beneficial characteristics. For these reasons, limiting the development of microbes on textiles during storage and usage is much desired. Antimicrobial treatments may be applied to the textiles to reduce or eliminate the negative effects. Consumer attitudes toward cleanliness and an active lifestyle have recently resulted in a strong demand for antimicrobial-treated clothing fabrics, prompting extensive research and development[4].

Microbes

Microbes are microscopic organisms that could be seen with the naked eye. Microorganisms such as bacteria, fungus, algae, and viruses are examples. Warmth and moisture are ideal conditions for bacterial development. Microbes are the smallest organisms that are invisible to the naked eye. Bacteria, fungus, algae, and viruses are among the microbes found there. Bacteria are unicellular creatures that develop quickly in warm, wet environments. The bacterium family is further divided into Gram positive, Gram negative (E-Coli), spore carrying, and non-spore bearing subgroups. By consuming the cellulose content in the textile material, microbes degrade the performance characteristics and quality of the textiles, causing discoloration. Fungi are shown to be active at a pH of 6.5. Algae is a kind of microbe that develops in the presence of water and sunlight, causing deeper stains on textiles. The dust particles in the environment may adhere to the human skin, causing allergic responses as well as respiratory problems[5].

Textiles with antimicrobial properties

Clariant's Actigard finishes are used in carpets to fight bacteria, house dust mites, and mould fungus. Avecia's Purista-branded goods were treated with Reputex 20, a poly biguanide hydrochloride (PHMB)-based antibacterial having a wide range of antimicrobial action and minimal mammalian toxicity. PHMB is best for cotton and cellulosic fabrics, although it may

also be used on cotton-polyester and nylon mixes. In addition to the aforementioned antimicrobial chemicals, Table 1 lists synthetic fibres having built-in antibacterial characteristics.

Process of Antimicrobial Finishing

Antimicrobial finishing gives the capacity to prevent the development or reproduction of at least some kinds of microorganisms or to kill) at least some types of microorganisms to the textile substrate. As a result, an antimicrobial finish should be capable of killing bacteria by breaching cell walls or altering cell membrane permeability, impeding microbe protein synthesis, and inhibiting enzyme production required for microbe feeding. Several well-known antimicrobials, such as silver, quaternary ammonium compounds, N-Halamines, triclosan, and polyhexamethylenebiguanide, are almost biocides[6].

TABLE 1: THE FIBRES DERIVED FROM SYNTHETIC WITH BUILT-IN ANTIMICROBIAL PROPERTIES

Polymer	Company	Brand
Polyester	Trevira	Trevira Bioactive
	Montefibre	Terital SANIWEAR
	Brilen	Bacterbril
Polyacryl	Accordis	Amicor
	Sterling	Biofresh
Polyamide	Kaneba	Livefresh
	R-STAT	R-STAT
	Nylstar	Meryl Skinlife
Polypropylene	Asota	Asota AM Sanitary
Polyvinyl chloride	Rhovyl	Rhovyl's asAantibacterial
Regenerated cellulose	Zimmer AG	Sea Cell Activated

Mechanism of Finishing

Based on the antimicrobial function of the specific finish on the textile, three finishing processes may be identified. Control-release, regeneration, and barrier-block are examples of these systems. The first two finishing mechanisms aren't working properly. The longevity of the control release mechanism after washing and the leaching of antimicrobial agents from fabric that may come into touch with the wearer's skin are also issues. These chemicals have the ability to irritate normal skin, resulting in severe skin irritation and allergy problems. These issues may arise if the fabric is treated with a regenerate mechanism, since these agents need chlorine bleach to activate their antimicrobial effects after washing. Chlorine bleach is not only damaging to cotton fabrics, but also to human skin. The barrier-block technique does not have the drawbacks that the other two approaches have. These compounds are attached to the surface of the fabric and do not leak, killing germs that come into touch with it[7].

The textiles get advantageous properties such as fire resistance, wrinkle resistance, mildew resistance, and so on throughout the finishing process. This high-value-added cloth has resulted in a competitive consumer market. In recent years, there has been a rising awareness of the need of maintaining a healthy and sanitary environment. The illness is usually transmitted from person to person via contact with the infected individual's hands, clothing, and other body parts. Antimicrobial textiles are widely used in surgical gowns, undergarments, and infant apparel, among other applications.

Traditional clothes and household textiles are increasingly being treated with antibacterial finishes. To regulate their impact, antimicrobial drugs kill or prevent pathogen development. Because of the presence of carbohydrate in textiles, natural fibres such as cotton are readily attacked by microorganisms. Antimicrobial finished fibres are used in a broad range of sports

apparel applications. Intimate appealing, footwear, medical textiles, furniture, automotive textiles, and so forth. The presence of microbes in textiles results in an unpleasant odour, discoloration, and health issues. Microbial infections may be harmful to the skin, therefore any clothing that is worn close to it should have an antibacterial coating.

Types of antimicrobial agents

Antimicrobial agents are of two types

- Leaching
- Non-leaching

For the antibacterial finish, synthetic antimicrobial compounds which including quaternary ammonium compound, triclosan, and others are employed. These synthetic antimicrobial medicines, on the other hand, are long-lasting yet have many adverse effects. Synthetic antimicrobial drugs are now prohibited, according to the World Health Organization. According to US and European regulations, there is a growing need for eco-friendly antimicrobial fabrics that utilize natural antimicrobial agents like chitosan that do not damage the user. A range of chemical agents are available that may impart substantial impact in textile fibres to prevent the development of microorganism. The subsequent sections go over the many kinds of antibacterial chemical agents:

Organic Antimicrobial Agents

Organic antimicrobial agents such as quaternary ammonium compounds (QACs), N-Halamines, Polyhexamethylene Biguanide; triclosan; silicon-based quaternary agent; iodohors, phenols and thiophenols, heterocyclics, inorganic salts, nitro compound, urea, amines and formaldehyde derivatives, heterocyclics, inorganic salts,

Antimicrobial activity of QACs was evaluated on protein basis wool, cellulose base cotton, synthetic base polyamides, and polyester, with MIC values ranging from 10-100mg/l, demonstrating excellent repeatability and washing durability. These forms kill the bacteria by changing cell membrane permeability, impeding the synthesis of proteins of germs, inhibiting enzyme production required for microbes' sustenance. Through a pad-drycure procedure followed by exposure to chlorine bleach, the N-halamine chemical is utilized to create antimicrobial cotton fabric. The chlorinated sample has antibacterial properties against both Gram +ve and Gram –ve microorganisms. It was discovered that after 15 days of storage, 85 percent of the chlorine in chlorinated textiles could be recharged, indicating that N-halamine compounds had excellent biocidal effectiveness for healthcare textiles. Triclosan, an organic antibacterial agent, has been studied for its antimicrobial properties in polyester, nylon, regenerated cellulose, and acrylic fibers, with MIC values of less than 10ppm against bacteria. Triclosan has good durability after use/washing and it inhibits microbiological growth by blocking lipid production. Poly-hexamethylene biguinide is the most widely used organic agent in the healthcare, pharmaceutical, and food industries (PHMB). It works against both kinds of bacteria as well as yeasts and fungus. PHMB is somewhat poisonous, and there have been less reports of skin infections. It was used to prevent microbiological development in a range of goods, including underwear and towel fabric, and it had an excellent washing durability.

In Organic Antimicrobial Agents

For antibacterial effects on textiles, inorganic finishing agents such as metal oxides, copper and zinc, titanium, magnesium, silver, and gold were used. With MIC values of 0.05-0.1 mg/l against gram negative bacteria, E.coli, these agents showed excellent durability for cellulose, protein, regenerated, and synthetic materials. Sliver is a widely used inorganic antibacterial chemical that kills bacteria by inhibiting and disengaging intracellular proteins. Silver, on the other hand, is a

minor toxicant that releases slowly and may cause cloth to wear out. Zeolites of the chabazite type with the best morphology and lowest silicon to aluminum ratio (Si/Al)solution were modified with different combinations of silver, copper, and zinc ions to make single, binary, and ternary metal cation-modified zeolites. Silver-based zeolites had better antimicrobial activity than the others and had good/suitable mechanical properties. Furthermore, the results verified its capacity to control the spread of hazardous microorganisms in food processing and storage environments. As a result, these cutting-edge antimicrobial materials have uses in hygiene surfaces, kitchen accessories, and packaging.

Antimicrobial Agents' Effects on Human Health and the Environment

Antimicrobial textiles' environmental effect is dependent on a number of variables, including substrate material, antimicrobial chemical manufacturing, textile treatment production, and ultimately disposal mode and is a major source of concern. Antimicrobial agent production and disposal have a substantial impact on environmental factors, from substrate selection through ultimate disposal. They may end up in the aquatic body if the discarded antibiotic is not eliminated from the effluent. One approach is to remove synthetic compounds via waste water treatment for triclosan. The breakdown of quaternary ammonium compounds (QACs), which are classified as "hard antimicrobial agents," is usually regarded unsatisfactory. Aerobic condition treatment is a suitable choice for triclosan elimination since it degrades in 41 minutes and has a half-life of approximately 10 days in water. Drug resistance occurs in microorganisms as a result of changes in their genetic composition as a result of continuous antimicrobial exposure. Resistant strains may reproduce and spread because they are not destroyed by standard antibiotics. Antimicrobial agent safety is receiving a lot of attention. Natural antimicrobial compounds having a broad antibacterial range and a low environmental impact are in great demand. When evaluating the bio effectiveness of antimicrobial agents on textiles, the mechanism of action, type of active agent, concentration on textile, skin sensitivity, and irritation level are the most important variables to consider.

LITERATURE REVIEW

Antimicrobial fabrics have acquired a lot of attention and acceptance in the market and in everyday life during the past two decades, according to A.RESHMA et al. Textile manufacturers continue to experiment with new techniques in order to improve the quality of their goods and please their consumers. Increased industrial competitiveness has resulted in the development of several synthetic antibacterial agents. Despite their widespread usage, synthetic agents represent a danger to both people and the environment. Several environmental organizations have enacted regulations regarding the use of synthetic substances in light of these grave concerns. Natural antimicrobial treatments, on the other hand, are gaining popularity since they have less side effects on people and are environmentally benign. Antimicrobial qualities may be found in plants such as basil, neem, turmeric, clove oil, chitosan, sercin, onion, aloevera, and pomegranate. This review article discusses the many natural antimicrobial sources, their impact on the general population, and the potential for utilizing these agents in textiles to impart antimicrobial characteristics and create various products[8].

Brigita Tomsic investigated antimicrobial agents currently used in fabrics, such as quaternary ammonium compounds, Nhalamines, chitosan, polybiguanides, and triclosan, noble metal and metal oxide nanoparticles, and bioactive plant-based products, as well as nanoparticles of noble metals and metal oxides. Antimicrobial agents are classified as biocides and biostats, leaching and binding antimicrobials, controlled-release and barrier-forming agents, and agents with poor and excellent washing resistance based on their antimicrobial activity, toxicity, durability, and ecological acceptability. Due to the requirement for environmentally acceptable antimicrobial finishing, great deal of research has developed for the synthesis of antimicrobial agents that

replace the leaking antimicrobials with bound antimicrobials. Polymerizable quaternary ammonium salts of acrylate groups, alkyltrialkoxysilanes with incorporated quaternary ammonium clusters, reactive cationic dyes, appropriate crosslinking agents, complexes with cyclodextrines, and encapsulated nanoparticle agents embedded into polymer matrices of various compositions have all been used to make the latter[9].

M Joshi et al. conducted research on antimicrobial completing of textiles utilizing natural materials such as chitosan, natural dyes, and other herbal items. Also discussed is research on antibacterial finishing of cotton fabric utilizing active components from neem seed extract, a natural herbal product. The neem tree, which may be found in abundance across the Indian subcontinent, is a rich source of therapeutic chemicals. The antibacterial properties of neem seed extract have been effectively incorporated into a cellulosic substrate, providing a semi-durable antibacterial activity against Gram-positive and Gram-negative bacteria[10].

DISCUSSION

After the oil sector, the textile industry is the second biggest polluter. As the world moves toward sustainability, it is becoming more essential for the textile sector to abandon harmful chemicals in favor of natural resources. Many nations across the globe have tightened regulations on the manufacturing of textile goods, forcing producers to seek out safer alternatives. There have been obvious advancements in natural dye/antimicrobial extraction techniques, such as the creation of ultrasonic, enzyme aided ultrasonic, and microwave assisted extraction methods, which have shown to be more efficient than traditional approaches. According to a review of relevant publications, most natural colors have intrinsic antibacterial characteristics and therefore may have significant therapeutic efficacy. While natural dyes are more environmentally friendly than synthetic dyes, the amount of mordents used for greater fastness is often higher than the official allowed concentration, posing environmental concerns. Metallic mordents are gradually being phased out in favor of cleaner/greener alternatives also including natural tannins from plants as bio-mordents, or cleaner technologies such as plasma, microwave, ultrasonic, and others that provide greater yields than traditional techniques. More scientific effort in the area is required to accomplish this.

CONCLUSION

Antimicrobial finishing agents come in a wide range of options. However, there may be restrictions in order to meet acceptable performance, environmental characteristics, and economic criteria. The majority of inorganic antimicrobial compounds are toxic, have a high propensity for environmental degradation, block a narrow spectrum of microorganisms, and have poor laundering durability; however, organic antimicrobial agents have fewer side effects. Plant-based nano-particle antimicrobial agents are increasingly being utilized in a variety of sectors, owing to their superior features and pathogen protection when compared to commonly used biocides, and such value-added finishes may offer sustainable healthcare applications in textiles. These dyes are derived from various plant components such as the bark, leaf, root, seed, fruit, and flower, which include coloring elements such as tannin, flavonoids, and quinonoids, among others. As a result, natural antibacterial compounds originating from plant sources will play a vital role in the future. This study has gone to great lengths to incorporate all relevant referenced articles on the use of natural dyes/antimicrobials in green textile treatments. However, due to a lack of resources and the large number of publications in this area, the comprehensiveness of this study may have been compromised. Please accept our deepest apologies to any and all writers whose work was not included in this evaluation.

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BASED ON LOCATION-SPECIFIC DATA, A TECHNO-ECONOMIC ANALYSIS OF SOLAR COOLING SYSTEMS IS CONDUCTED

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ABSTRACT

If all cooling and heating systems in OECD nations were powered by solar energy, solar energy could theoretically provide 10% of total energy consumption. This study examines cooling systems for residential and utility buildings in both South and North Europe, and analyzes the most viable options when solar energy is utilized to meet these buildings' cooling demands when heat rejection temperatures are high. The solar electric and solar thermal pathways are also being explored. Both concentrating and non-concentrating thermal methods are discussed. The conclusion is that vapor compression cycles in conjunction with PV collectors now provide the most cost-effective options. Vapor compression cycles powered by energy supplied by parabolic dish collectors and Stirling engines are the second best choice. The double-effect absorption cycle with concentrated trough collectors is the best thermally driven option, followed by desiccant systems with flat-plate solar collectors. Options for adsorption systems are considerably costlier.

KEYWORDS: *Refrigeration, Solar Energy, Solar Collector, Solar Cooling Compression System, Sorption System.*

1. INTRODUCTION

Our planet's primary source of energy is solar energy. The availability of energy in the terrestrial environment is shown by Hermann (2006). The majority of solar radiation that reaches the terrestrial environment is dispersed, with just a tiny portion transformed into solar energy (959 PJ year1, compared to 1,356,048,000 PJ year1 wasted only for surface heating). According to the International Energy Agency (IEA), global solar conversion in 2011 was 711 PJ (74%) thermal, 234 PJ (24%) PV, and 14 PJ (2%) concentrating solar power, for a total of 959 PJ year1. As a result, solar energy's potential is enormous. The distribution of energy uses in the residential sector of OECD member nations in 2011 is shown in Figure 1 (IEA, 2013). The 25,000 PJ total annual energy usage is a tiny percentage of the solar energy lost in surface heating. Space

heating accounted for almost half of the total (12,350 PJ), while space cooling accounted for just 6%. (1610 PJ). The "services" sector, which includes utility buildings, is not included in these figures, although it uses a significant amount of energy for heating and cooling (about 7000 PJ). This means that solar-driven refrigeration/heat pump cycles have the capacity to service approximately 10% of OECD nations' energy consumption (225,752 PJ). Although solar cooling is mostly utilized to remove cooling loads from applications, the same cycles that are used as heat pumps will have an advantage over using solar heat directly for heating. The identification of the demand side is the first stage in the assessment of solar cooling systems: which applications would be best serviced by solar cooling and how does the cooling demand change over time. We differentiate between residential air cooling, utility building air conditioning, and freezing applications in this research. The criteria for freezing applications are extremely precise, and they will not be addressed in this article [1][2][3].

Paul provided the utility building cooling load profile for Northern Europe (1995). The ratio of the peak cooling power needs of residential buildings in the Netherlands and Spain was used to calculate the peak cooling power demand for the utility building in Spain. During the same time period, the graphic also displays the highest solar radiation for the respective regions. The scale has been tweaked to emphasize the correlation between solar radiation availability and cooling load demand. The heat rejection temperatures on the process side are considered to be 10 K higher than the ambient temperatures. Solar cooling is a reasonable option since cooling demand rises in tandem with the intensity of solar radiation. Many initiatives for the development or demonstration of solar cooling technologies and solar cooling systems were undertaken. an absorber, ambient c condenser, cool cooling e evaporator, cool cooling el electricity g generator, heat driving heat pow mechanical power s, solar radiation, solar collector Standard test conditions (STC). Heating and cooling of the space cooking utensils utensThe initial goal of this article is to provide an overview of the state-of-the-art of the various methods available for solar-powered cooling. In the past, most review papers focused on solar thermal technologies, particularly sorption cooling (Lamp and Ziegler, 1998; Li and Sumathy, 2000; Grossman, 2002). Kim and Infante Ferreira (2008) provided a review that included solar electric, thermo mechanical, sorption, and other newly developing technologies in order to provide a wider perspective. This technique will be used here as well. Both technologies are considered by Lazzarin (2014). The second goal is to evaluate the capabilities of these various technologies in terms of providing competitive, long-term solutions. By comparing the starting prices of several alternative solar cooling pathways, the present commercial state of various sun cooling technologies will be assessed. Several of the most popular routes will be examined as alternatives in this study. Figure 3 depicts the technologies that were examined. Chan et al. (2010), Duan et al. (2012), and Santamouris and Kolokotsa recently evaluated passive solar cooling methods (2013). These methods include natural ventilation-based cooling as well as evaporative cooling.

Last but not least, evaporative cooling may be used both directly and indirectly. The topic of passive solar technology will not be discussed further.Photovoltaic panels and an electrical cooling device are the primary components of a solar electric cooling system. Solar cells are semiconductors, and their efficiency and cost vary greatly depending on the materials used and the manufacturing techniques used. Wafer-based crystalline silicon cells accounted for almost 90% of the PV industry in 2010 (Tyagi et al., 2013). In 2013, specifically for the Netherlands, these commercial cells had an average peak efficiency of 13%. Defines efficiency as the ratio of power production W (kW) to the product of solar panel surface area as (m2) and incoming radiation Ip (kW m2). The nominal efficiency is usually calculated using the Ip 14 1 kW m2 formula. Around 750 solar cooling systems were built globally in 2011, including installations with modest capacities (less than 20 kW) (IEA, 2012). Although each technology has its own set

of advantages and disadvantages, a high initial cost is a common issue. The necessary investments for converting solar energy into electrical or thermal energy to supply the various technologies were estimated in the preceding sections. An estimate of the investment costs of various cooling cycle methods, including installation expenses. It also includes values suggested in recent publications for comparison. Some systems need the use of an engine (Stirling or Rankine).

After that, a value of k V 1.7 kW1 shaft power was evaluated. the different solar cooling methods described in the preceding sections in terms of starting costs for residential applications in the Netherlands. The vapor compression cycle, powered by energy supplied by solar collectors, seems to be the most appealing option for Central European circumstances at the moment; the cost of these collectors has dropped dramatically. The second best alternative is a vapor compression cycle powered by energy supplied by parabolic dish collectors and Stirling engines, which have a comparable investment level. With a considerable difference, double-effect absorption cycles in conjunction with concentrating parabolic trough collectors and desiccant cooling in combination with flat plate collectors follow. Other alternatives need considerably more investment. .Figure 1 shows the Alternative Routes from Solar Energy into Cooling/Heating Effect Using Thermodynamic CyclesDespite the fact that many sun cooling technologies are deemed mature, solar air conditioning systems have a limited overall cooling capability.

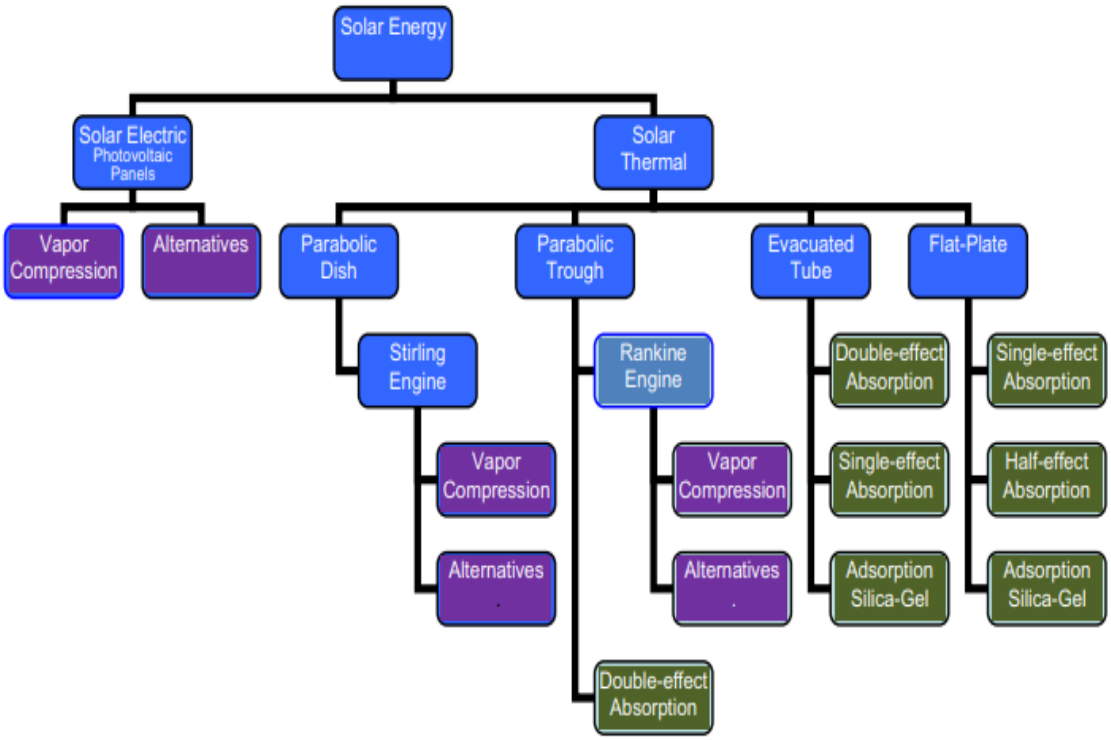

Figure 1: Alternative Routes from Solar Energy into Cooling/Heating Effect Using Thermodynamic Cycles.

2. DISCUSSION:

The inverter, connections, and dirt buildup on the surface of cells are all taken into account, and the average value is 0.86. Huld et al. have presented a technique for predicting Panel (which is expressed in C) (2010). For the climatic conditions in the Netherlands, this translates to an annual energy output of 106 kWh m2 and a peak power of 94 W m2. According to the IEA

(2013), solar PV capital costs are continuing to decrease, with large-scale systems costing V 1.1e2.6 Wp1 and small-scale systems at V 1.8e4.5 Wp1 in 2012. The cost of a solar PV panel varies greatly depending on the market. The average installed consumer price of a solar panel in the Netherlands in 2013 for small systems was V 250 per m2 (V 2.1 per Wp for a peak output of 117.5 W under 1 kW m2 of solar radiation). The DCeAC converter and electric net connection are included in this pricing. To account for variations in local markets, the average installed consumer price of a PV solar panel for small-scale projects is estimated to be in the range V 250e400 per m2 and in the range V 150e250 per m2 for large-scale projects. When coupled with a traditional vapor compression system, the greatest benefit of utilizing solar panels for cooling is the ease of installation and high overall efficiency In thermodynamics, COP (Coefficient of Performance) is an alternate word for efficiency. The COP of a Carnot (ideal) cycle operating in the same high and low temperature reservoirs limits the efficiency of vapor compression cycles. The efficiency of the second rule, a, may therefore be utilized to approximate the actual COP of the cycle: The efficiency of the second law will be determined by operating circumstances and component design [4]. For vapor compression cycles, anis set to 0.50 for calculation reasons. This benefit can be readily achieved in real-world systems without requiring significant expenditures. Solar power systems will always require some kind of energy storage and/or backup. Batteries may be used in solar electric systems, or they can be electric-net linked, allowing energy to be imported or exported from the system. The use of DC compressors provides for easy rotational speed adjustment and therefore efficient part load operation. Solar photovoltaic panels have become very affordable in recent years, making them highly competitive in contrast to other solar cooling methods. Table 3 summarizes the costs for the applications considered when the above-mentioned panel costs are combined with a solar photovoltaic panel with a 13 percent peak efficiency and a vapor compression air conditioner operating at a heat rejection temperature of 40 C (COP 14 3.9) or 50 C (COP 14 2.9) in the Netherlands and Central Spain, respectively.

A pinnacle Solar Power Electricity generated by the sun Photovoltaic Panels is solar panels that convert sunlight into electricity. shows the usual cooling load profile of residential structures in central Spain and the Netherlands (left) under peak circumstances, as well as the accompanying solar radiation (right)[5]. This load has been divided by 100 to correspond to the same scale. The electric power requirements for the Netherlands and Central Spain, respectively, are 0.77 kW and 1.38 kW for residential applications and 64.1 kW and 114.8 kW for office building uses, based on cooling COPs under peak load circumstances and peak load values The matching area and collector investment levels. Solar thermal cooling is number three. Solar thermal systems generate cooling by using solar heat rather than solar energy. The solar concentrating technologies are shown on the left hand side of the solar thermal conversion technologies in Fig. 3. The development of concentrated solar power (CSP) has not been as rapid as that of solar PV. Their solar energy contribution is less than 2%. These systems concentrate solar energy, allowing for very high working fluid temperatures.The schematics of parabolic dish collectors (point-concentrating; working fluid temperatures up to 750 C) (line-concentrating; working fluid temperatures up to 400 °C). In contrast to fixed inclination non-concentrating thermal collectors, both kinds utilize sun tracking systems to achieve high radiation levels for a longer length of time [6]

2.1. Application:

The reduction in irradiance is a significant consequence of solar thermal collector performance. The irradiance cut is the irradiance at which a collector begins to produce heat at the specified temperature level. Van Leeuwen (2010) calculated the heat production of collectors for three distinct heat delivery temperature levels using the average solar irradiation for a particular site in South Spain in conjunction with the associated ambient temperatures. Flat plate collectors

generate more heat on a daily basis than evacuated tube collectors. However, the difference between low and high heat delivery temperatures is only around 25%, whereas the difference between high and low temperature variations is more than 60%.Because flat-plate collectors are about half the price of evacuated tube collectors, the heat produced by flat-plate collectors is always less expensive (for the specific location considered).A heat engine transforms solar heat to mechanical effort, which powers a mechanical compressor in a vapor compression cooling machine in a solar thermo-mechanical cooling system. Figure 8 depicts a schematic design of such a cooling system (Kim and Infante Ferreira, 2008). A solar collector absorbs solar radiation Qs from the sun and provides Qg to a heat engine at temperature TH, as shown in the diagram. The thermal efficiency of a solar thermal collector, hsolheat, is defined as the ratio of supply heat Qg to radiation Qs. At temperature TM, a heat engine generates mechanical power W and rejects heat Qa to the environment. The power generated per heat inputQg, Eq, is defined as the engine efficiency, hheatpow. The cooling cycle's compressor is driven by the mechanical power W to remove heat Qe from the application at temperature TC. At the temperature TM, waste heat Qc, which is equal to the sum of Qe and W, is rejected to the ambient. The cooling cycle's efficiency is the same. Figure 2 shows e Schematic diagrams of non-concentrating solar collectors, Kim and Infante Ferreira (2008): flat-plate collector (left) and evacuated tube collector (right) [7].

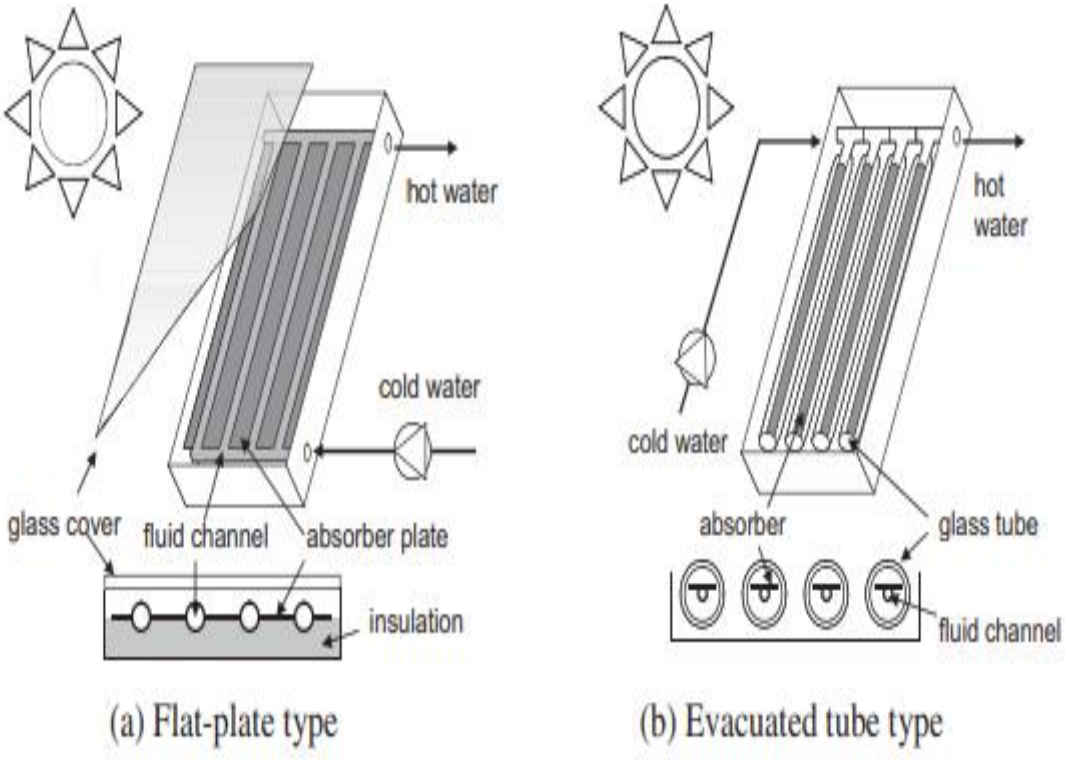

Figure 2: e Schematic diagrams of non-concentrating solar collectors, Kim and Infante Ferreira (2008): flat-plate collector (left) and evacuated tube collector (right).

2.2. Advantage:

The reduction in irradiance is a significant consequence of solar thermal collector performance. The irradiance cut is the irradiance at which a collector begins to produce heat at the specified temperature level. Van Leeuwen (2010) calculated the heat production of collectors for three distinct heat delivery temperature levels using the average solar irradiation for a particular site in South Spain in conjunction with the associated ambient temperatures. Generate more heat on a daily basis than evacuated tube collectors. However, the difference between low and high heat

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2.3. Working:

For the most part, absorption cooling has been used. Sun heating and cooling It just needs a little amount of electricity or none at all, and it may be used in a variety of ways. The physical dimensions of an absorption device have the same capacity. Due to the fact that adsorption machines are smaller, due to the absorbent's high heat transfer coefficient. Besides, the fluidity of the absorbent allows for additional freedom in designing a machine that is more compact and/or efficient. Kim and I are a couple. Infante Ferreira (2008) presents a summary of a vast number of studies research into sunlight absorption cooling Cooling by the sunindicates that the heat rejection temperatures are quite high. Similarlyin comparison to the vapor compression cycle's method, an absorption cooling machine's efficiency may be anticipated. By assuming a constant temperature, heat cools as COPCarnot.a number for the efficiency of the second law, using previously published performance data (Kim and Infante Ferreira, 2005), A circulation ratio (strong mass flow) should be used whenever feasible has been calculated by dividing the answer by the mass flow of refrigerant. Considered. H2OeLiBr has a single-effect and a double-effect. At heat rejection temperatures, cooling cycles are unable to function. Due to the crystallization limit at low water concentrations, the temperature must be kept below 50°C. Temperatures of 40 degrees Celsius need a bigger heat rejection system.Ratio of circulation taking the same operational conditions into account solar electric cooling devices that focus the sun's energy. The locality as a result of the electric power needs of the many applications, as well as collector efficiency The Only collectors are concerned about investing. Area that is required The most competitive is NH3eH2O.via the invention of solar-powered air conditioning pathway of adsorption Zeolite, silica gel, and activated carbon are examples of adsorbents. Carbon and alumina are physical adsorbents with high adsorption capacity.Permeable structures with surface-to-volume ratios of at least Hundreds of refrigerant traps that can selectively capture and hold refrigerants. They can be renewed if they get saturated. Getting warmed up when both an adsorbent and a refrigerant are present, the adsorbent would maintain pressure in the same vessel by adsorbing the evaporating refrigerant. The procedure is as follows: since the adsorbent must be replenished on a regular basis after it has reached saturation. As a result, several adsorbent beds are used. For continuous functioning, are needed. Adsorption chillers have cooling power densities that are very high. Are much lower than those for absorption chillers. Adsorption in big solar cooling systems, technology may be competitive. Its poor power density isn't an issue here. For small- or medium-sized businesses, It tends to be too large for medium-sized solar cooling systems As well as being costly [9].

3. CONCLUSION

There are many methods for converting solar energy into a cooling effect. This paper provides an overview of the most promising choices for particular applications in Central Spain and the Netherlands, as well as a ranking of the options based on the necessary investments. This investment level is based on the performance of the various alternative systems as stated. The

best choices seem to be vapor compression cycles combined with PV collectors. Vapor compression cycles powered by energy supplied by parabolic dish collectors and Stirling engines are the second best choice. The double-effect absorption cycle with concentrated trough collectors is the best thermally driven option, followed by desiccant systems with flat-plate solar collectors. Options for adsorption systems are considerably costlier.Again, the most appealing option for this application is the electricity is used to power the vapor compression cycle. Collectors of photovoltaic energy The cycle of vapor compression is fueled bestirring and parabolic dish collectors provide energy. The second best choice is engines. The twofold effect H_2OeLiBr absorption cycle cannot be used under these operating circumstances. because it would approach the crystallization line limit if it were to operate certain circumstances as a result, the second-best option is the Combining a single effect absorption cycle with a parabolic curve collecting in a trough Desiccant cooling is now used in conjunction with Flat-plate collectors are carefully following. The amount of money invested by theThe cost of other options is considerably greater. Alternative doubleeffect cycles, which are not constrained by crystallization line constraints, are anticipated to bring these cycles to fruition. A comparable stance to the one they hold for Central Europe because higher capacity may result in varying ratios between the two, investment in solar collectors and cooling systems the level of the various options The same seems to be true for industrial applications. The same rating system applies to residential applicants. PV has been around since Solar panels for large-scale projects are less expensive; nevertheless, solar panels for industrial use are more expensive.vapor compression cycles powered by energy supplied by solar collectors are unquestionably the best option for large-scale applications [10]

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A REVIEW PAPER ON INTERNET OF THINGS (IOT)

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ABSTRACT

Urban Areas, Home Automation, Online, World Wide Web, Connectivity, Internet-of-Battlefield-Things, and other civilian and military applications of the Internet-of-Things are becoming more common. In this study, we review papers published in English since January 2016 that offer IoT security solutions. We offer a number of findings, including the paucity of publicly accessible IoT datasets for researchers and practitioners to utilize. Given the potentially sensitive nature of IoT information, a standard for exchanging IoT datasets across academic and practitioner groups, as well as other relevant stakeholders, is required.These devices will produce large or fast/real-time data streams, depending on the extent of the application. Applying analytics to such digital data to find new information, anticipate future insights, and perform control choices is a critical step that distinguishes IoT as a viable business model and a technology that improves quality of life. The potential for blockchains in enabling safe IoT dataset sharing (e.g., utilizing blockchain to guarantee the integrity of shared datasets) and protecting IoT systems is then discussed, followed by two hypothetical blockchain-based methods. The article is then concluded with nine possible research topics.

KEYWORDS:*Application Layer, Iot, Perception Layer, Security, Transport Layer.*

1. INTRODUCTION

The Internet of Things (IoT) goal is to use a broad variety of sophisticated technologies to convert conventional things into smart objects, ranging from embedded devices and electronic technology to Http protocol, data analytics, and so on. The potential economic effect of the Internet of Things is anticipated to open up a slew of new business possibilities and drive the development of IoT-based services. According to a study by McKinsey on the worldwide economic effect of IoT, the yearly economic impact of IoT in 2025 will be between $2.7 and $6.2 trillion. Healthcare takes up the majority of the market, accounting for 41%, followed by

industrial and energy, which account for 33% and 7% of the IoT market, accordingly. Transport, agricultural, public development, security, and retail each account for approximately 15% of the overall IoT market. These projections indicate that IoT services, their produced data, and, as a result, their associated market, will expand at a huge and sharp pace in the next years[1].

Because portions of many professions may be "ideal for ML applications," machine learning (ML) will have an impact on employment and the workforce. This will boost demand machine learning solutions, as well as the tasks, platforms, and expertise required to create them. In McKinsey's study, the economic effect of machine learning is described as "the use of computers to do activities that require sophisticated analyses, nuanced judgements, and creative problem solving." Advances in machine learning methods, such as deep learning and neural networks, are the primary facilitators of knowledge job automation, according to the study. Organic user interfaces, such as voice and gesture recognition, are additional enablers that are gaining traction thanks to machine learning. By 2025, the projected annual economic effect of knowledge job automation may be between $5.2 trillion and $6.7 trillion. The figure depicts the breakdown of this estimate by occupation. In comparison to the economic effect of IoT, this estimate emphasizes the importance of extracting value from data and the prospective implications of machine learning on the economic position of people and communities. Individuals and nations alike are affected by these economic effects, as people must adapt to new ways of generating money that are appropriate for them in order to retain their desired level of life[2]–[5].

Many IoT applications have emerged in recent years in many vertical areas, such as health, transportation, home devices, smart city, agriculture, education, and so on. An intelligent learning mechanism for prediction (i.e., regression, classifying, and clusters), data mining and pattern recognition, or data analytics in general, is a key component of most of these applications. Figure 1 shows the IoT data generation at different levels and deep learning models to address their knowledge abstraction[6].

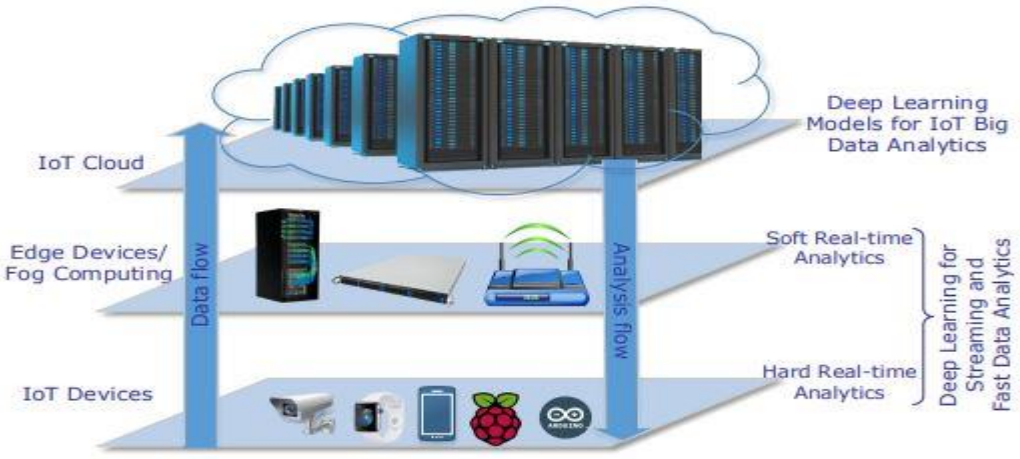

Figure 1: The above figure shows the IoT data generation at different levels and deep learning models to address their knowledge abstraction.

Deep Learning (DL) is one of the numerous machine-learning techniques that has been actively used in various IoT applications in recent years. The top three key technology trends for 2017 were revealed at Gartner Symposium/ITxpo 2016, and these two technologies (i.e., DL and IoT) are among them. Traditional machine learning methods do not meet the increasing analytic requirements of IoT systems, which is why DL has received so much attention. Instead, depending on the hierarchy of IoT data production and administration, IoT systems need various contemporary data analytic techniques and artificial intelligence (AI) technologies. The growing

popularity in the Internet of Things (IoT) and its derivative big data need a thorough understanding of its definitions, building blocks, potentials, and difficulties by stakeholders. There is a two-way connection between IoT and big data. On the one hand, the Internet of Things is a major source of big data, and on the other, it is a key target for big data analytics to enhance IoT operations and services. Furthermore, IoT big data analytics has proved to be beneficial to society. The Department of Park Management in Miami, for example, has stated that by identifying and repairing broken pipes, they have saved approximately one million dollars on their water costs[7]–[12].

IoT data is distinct from traditional big data. We need to investigate the characteristics of IoT data as well as how they vary from those of conventional big data to better understand the needs for IoT data analytics.

1.1 The following qualities may be found in IoT data:

1.1.1 Large-Scale Streaming Data:

For IoT applications, a plethora of data collecting devices are dispersed and deployed, generating streams of data on a continual basis. As a result, a massive amount of continuous data is generated.

1.1.2 Heterogeneity:

Because various IoT data collection devices collect different information, data heterogeneity occurs.

1.1.3 Time And Space Correlation:

In most IoT applications, sensor devices are connected to a particular place, thus each data item has a location and a time-stamp.

1.1.4 High-noise data:

Because IoT applications use small bits of data, many of these data may be susceptible to mistakes and noise during collection and transmission.

Although extracting hidden data and understanding from big data has the potential to improve our lives, it is not a simple or straightforward process. New technologies, methods, and infrastructures are required for such a complicated and difficult job that goes beyond the capability of conventional inference and learning techniques. Fortunately, recent advancements in both fast computing and sophisticated machine learning methods are paving the way for IoT-friendly big data analytics and information extraction.

Beyond big data analytics, IoT data necessitates a new kind of analytics, known as fast and fast data analytics, to support applications that need time-sensitive (i.e., real-time or close to real) operations.

Indeed, applications including such automated cars, fire prediction, and identification of driver/elderly position (and therefore awareness and/or health state) require rapid data processing and actions to accomplish their goals. Several academics have developed frameworks and methods for rapid streaming data processing that take use of cloud infrastructure and services. Fast analytics on smaller level platforms (i.e., at the system edge) and on the IoT devices themselves are required for the aforementioned IoT applications, among others. Autonomous vehicles, for example, must make quick judgments on driving activities including such lane or speed changes. Indeed, fast analytics of potentially multi-modal data streaming from the many sources, including multiple vehicle sensing (e.g., cameras, radars, LIDARs, vehicle speed, left/right signals, etc.), connections from other automobiles, and vehicle entities (e.g., traffic lights, traffic signs), should be used to support such decisions. In this instance, the delay in

sending data into the cloud server for processing and delivering the answer may result in traffic infractions or accidents. Detecting pedestrians by such machines would be a more dangerous situation. To avoid catastrophic accidents, accurate identification should be done in real time. To avoid needless and expensive connection delays, these situations indicate that rapid data analytics for IoT must be near to or at the data source.

1.2 Threats of IOT Model:

Three major layers may be used to properly define and explain a generic IoT system:

- Perception Layer
- Transport Layer
- Application Layer

It has its own set of technologies, each of which has its own set of problems and potential security flaws. Figure 2shows the IoT system model.

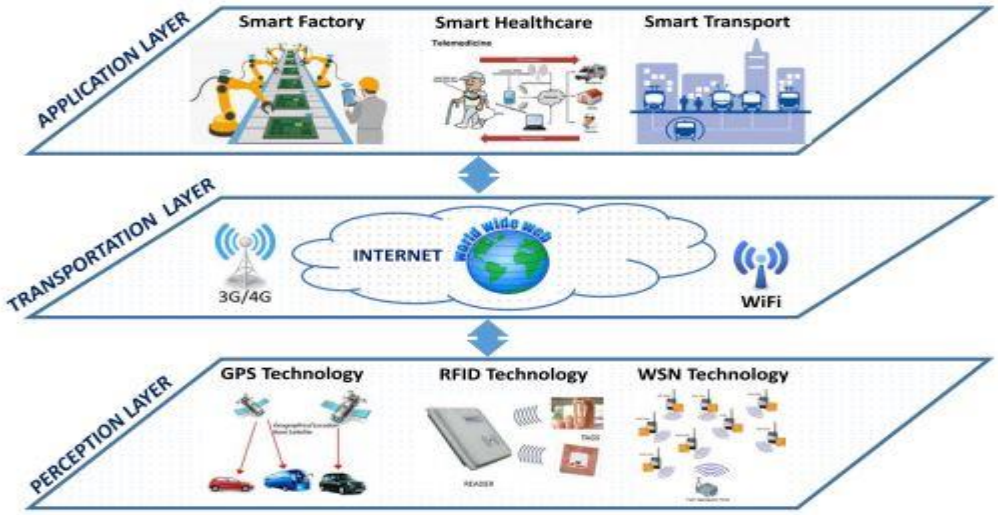

Figure 2: The above figure shows the IoT system model.

1.2.1 Perception Layer:

The first layer is for physical IoT sensors to enable data collecting and processing using several standard technologies including radio-frequency identification (RFID), wireless sensor networks (WSN), RFID sensor networks (RSN), and GPS. This layer contains sensors and actuators that conduct various measurements (temperature, acceleration, humidity, etc.) as well as functions like location querying. The major security risks posed by the perception layer are as follows, due to restricted node resources and a dispersed structured structure.

1.2.1.1 Physical Attack:

These attacks target the hardware components of the IoT system, and therefore need the attacker to be physically near to or within the IoT system to be successful. The following are some instances of such assaults.

- **Tampering Nodes:**

An attacker may harm a sensor node by physically changing the whole node or a portion of its hardware, or by electronically probing the nodes to obtain access to and change critical information like shared cryptographic keys or routing tables.

- **Malicious Code Injection:**

The attacker compromises a node by physically inserting malicious code into it, which allows him to get access to the IoT system.

1.2.1.2 False Identity:

Because authentication in a distributed environment is challenging, rogue nodes may employ a false identity to carry out hostile or collusion activities.

1.2.1.3 DoS (Distributed Denial of Service) Attacks:

Attackers take advantage of the nodes' limited processing power to render them unusable.

1.2.1.4 Attacks on the routing system:

During the data collecting and forwarding procedure, intermediate malicious nodes (for example, in a WSN) may alter the correct routing routes.

1.2.1.5 Cyber-Attacks on Data Transit:

Various attacks on data transmission confidentiality and integrity [e.g., sniffer and man-in-the-middle (MITM)];

1.2.2 Transport Layer:

The perception layer is primarily served by the transportation layer, which offers a ubiquitous access environment. This layer's goal is to send the collected data from the perception layer to any information processing system through existing communication networks utilized by both access networks (3G, WiFi, ad hoc networks, and so on) and core networks (Internet).

A short review of security problems in wireless networks, such as cellular networks, may be found in. The open and diverse design of an IP-based LTE network, according to this study, is resulting in a higher number of security risks than 3G networks.

The following are the major security risks at this level:

1.2.2.1 Attacks On The Routing System*:*

During the data collecting and forwarding procedure, intermediate malicious nodes (for example, in a WSN) may alter the correct routing routes.

1.2.2.2 Denial Of Service (Dos) Attacks:

The transportation layer is susceptible to attack because of the variety and complexity of the IoT network.

1.2.2.3 Cyber-Attacks On Data Transit:

Various assaults on data integrity and confidentiality during data transmission in access or core networks

1.2.3 Application Layer:

Customers request services, which are provided by the application layer. Customers that want temperature and air humidity readings, for example, may get these via the application layer. This layer is critical for the Internet of Things because it can offer high-quality smart services to satisfy consumers' requirements. Many different IoT environments (such as smart cities, smart healthcare, and smart factories) can be implemented at this level; additionally, an application support sublayer could be implemented throughout specific middleware and cloud computing platforms to support all types of business services and to realize intelligent computation and resource allocation.

The following are the major security risks inside this layer:

1.2.3.1 Data Breach:

Knowing the vulnerabilities of the service or program, the attacker may simply steal data (including data users, such as user passwords).

1.2.3.2 Denial-of-Service Attack:

Attackers may take down the application or service's availability.

1.2.3.3 Injection of Malicious Code:

Attackers may inject malicious code into software programs by exploiting known flaws.

2. DISCUSSION

The significance of security in the IoT is progressively increasing, in tandem with the fast growth of the IoT sector.Indeed; we have demonstrated that the IoT system architecture has many security concerns, including attacks that may exploit certain potential flaws. As a result, starting with the categorization of the many risks linked to each particular level of the community IoT system architecture, it is essential to properly implement trust security with in IoT world.The perception layer, according to this study, is the most susceptible level of the IoT system architecture owing to the activity in patients of IoT devices, their limited resources, and their technical variety. As a result, it is essential to begin working on the key problems at this level in the near future by developing lightweight security mechanisms that can adapt to diverse settings with resource-constrained devices.

3. CONCLUSION

The Internet of Things (IoT), a new concept that aims to improve the quality of life by linking different smart gadgets, technologies, and apps, is rapidly gaining traction in our contemporary lives. In general, the Internet of Things (IoT) would enable the automation of anything around us. This study provided an outline of the concept's foundation and applications. We have summarized several studies on IoT layered architectures and described security threats based mostly on layers that may affect IoT performance. The features and limits of communication technology have been described. We combed the literature for current techniques to safeguard IoT infrastructure and evaluated these security approaches in terms of how they handle IoT security concerns. We have also compiled a list of the current security techniques' limits and limitations.We also suggested a novel six-tiered layered architecture for securing IoT infrastructure.In addition, many open research problems related to IoT technology were addressed as potential future paths. These issues must be addressed and handled right now.

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CHARACTERISTICS OF GEORGE ORUELL ARTISTIC STYLE

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ABSTRACT

The article discusses the peculiarities and artistic skills of George Orwell's artistic style, his attitude to social reality, the problems of commonality and originality in his artistic reincarnation. Observing the peculiarities of the writer's distinctive colorful images and portraits, the character is sketched, and the skill of welding each impression to it with a strong stroke and great speed is analyzed. The concept of society, which is a very important and global problem for the development of society and fiction, as well as the dialectic of multi-layered imagery in the artistic interpretation of this topic are summarized in the example of English and Uzbek literature.

KEYWORDS: *Double Thinking, Dystopia, Dictatorial System, Social Content, Multi-Layered Metaphor, Artistic Psychology, Personality And Society, Artistic Mode, Socio-Moral Character, Reality Of Social Life, Philosophical Thinking, Personality Tragedy, Subconscious, Time And Space, Conflict.*

INTRODUCTION

The masterpieces, which are very popular in world literature, can be conditionally divided into two. The first is the works written in protest of Dostoevsky's "Demons", L. Tolstoy's "War and Peace", Stendhal's "Church of Parma", E. Hemingway's "Goodbye, weapon!" Solzhenitsyn's "Gulag archipelago", Igor Bunich's "Gold of the Party", ChingizAitmatov's "Straw Road", "Mountains are falling", O. Yakubov's "Address of Justice", Sh. The second type of works is the masterpieces of art, which are in essence against the existing systems, oppression, human freedom, the freedom of nations, in high art: Dante Alighieri's "Divine Comedy", A. Navoi's "Farhod and Shirin", "SaddiIskandariy", Goethe's Faust ",“ The Adventures of Don Quixote "by Miguel de Cervantes, J. Swift's "Gulliver's Travels" (J. Orwell's ideal favorite artist), M. Bulgakov's "Ityurak", "Seeds of Disaster", "Master and Margarita", F. Kafka's "Process",

A.Kamyu's "The Stranger", L.Andrev's "Judas Iscariot", A.Qodiri's "Last Days", "Scorpion from the Altar", Cholpon's "Night and Day", Fitrat's "Abulfayzkhan", "Resurrection", Ch. Aitmatov's works such as "Asrgatatigulik kun", "Qiyamat", A. Aripov's "Jannatgayol", "Ranjkom", O. Mukhtor's "Fu", "Aflotun", H. Dostmuhammad's "Jajman", N. Eshonqul's "Tobut". based on symbolism and social metaphor. It is a unique style that has a very long history in world literature, and is also unique to the work of the English writer George Orwell, whose works have become bestsellers. The works of MM Dost, which we have based on a comparative-typological study with the work of J. Orwell, are also based on symbols and metaphors, social allusions.

In order for a person to strive for freedom, independence, individual love, a person must first be able to rise to the highest stage of his development. For this, there must be the necessary social conditions, that is, the state must renounce violence and the use of primitive force, and focus on the development of science, the perfection of the individual. If such a perfect system is created, neither external nor internal forces can control it. One of the social functions of works of art is to promote this idea. One of the peculiarities of J. Orwell's style is that in it the sentences are short, often logically complete, in the form of a simple sentence, and the comments are clearly stated in the author's language. "Even in the name of our leader, there is a faceless overthrow of the facts," he said. The Ministry of Peace deals with war, the Ministry of Truth with lies, the Ministry of Love with torture, the Ministry of Welfare with famine. These contradictions are neither accidental nor hypocritical; it is a practice of double thinking"[1; 203]. It is clear from the quotation that the writer expresses his thoughts very closely, and it is difficult for the average reader to fully comprehend the sentences being uttered from one reading to the end. In order to digest meaningful ideas, the reader must be aware of socio-political life, society and history, as well as have the ability to think in a healthy and deep way.

The paradox of love and power is fully, deeply expressed in George Orwell's 1984 novel. As in any dystopia, the concepts of love and power are the same here: as opposed to the mutual love of the ruler and the citizens, they are seen as mutually exclusive.Because the demand of the party is only to love oneself, to completely forget everything else, to sacrifice oneself for the party.

That's why the relationship between power and people (especially Winston and Julia) is built on a love story scenario. Power seeks to assimilate the object of love, to fully subdue all its actions and to direct its thoughts to itself, to interest the object, to demonstrate various techniques and mechanisms: from simple encounter to sadistic violence, the essence of the dictatorial system is demonstrated. The party controls everything, even the couple's relationship.The situation escalates to the point where people are imprisoned and punished just like Parsons for their dreams [1; 221].

In 1984, a dispute between Winston and O'Brien revealed the government's intentions. "You're recovering. There is no flaw in your mind. Emotionally, you have not had a definite improvement. Tell me, Winston, just remember, don't lie, lie won't hide from me, you know that, tell me, how do you actually look at Big Brother?

"I hate him."

"You hate him." Good. Then it's time to take the last step for you. You must love Big Brother. Obedience to him is not enough; you must love him "[1; 267].

Winston tries to resist these claims as much as possible, but the horrific torture, the physical torment that eats away at the human mind, eventually breaks his spirit. He will be forced to sell the woman he loves, to betray her. At the same time, both sides - Winston and Julia - fall victim

to the love in their hearts, and the love duel ends with the “defeat” of the lover. The play details the relationship between Winston, Smith, and O’Brien, as well as images of women that fit into a well-known system of gender stereotypes. It should be noted that there are significant differences in the interpretation of the concept of love by the English and Uzbek writers, which can be explained by national identity.

MM DostYakhshibaev, who forgot himself as Oshno, could not understand the meaning of his life, was afraid of his own thoughts if he thought about it, spit on everything like Avvalbek, betaine, indecisive, who can say what like Olloyor? created the image of people who are accustomed to it as well, without will. This is what the communist ideology, the dictatorial system, has done to them. There is also a deep symbolic meaning when Ms. Muhsina mentions Oshna’s name with excitement and respect. He has become a slave to power, career, fame, and luxury. George Orwell predicts that future generations will be in such a predicament: "Winston, how does man establish his authority over others?"

Winston thought.

"By torturing him," he said.

- Absolutely right. By torturing him. Obedience alone is not enough. If a person does not suffer, how do you believe that he is doing your will, not his own? Power consists of suffering and humiliation. The power is to break the minds of the people and restore them in a way that is acceptable to you ”[1; 253].

Indeed, even 30 years ago, we would wake up every morning to the anthem "Hello, the Russian people, our great brother, our living genius, Lenin." We have almost forgotten national values like Hayit and Navruz. We never tired of repeating the slogan that the proletarians of the world should unite. All this is reflected in "Lolazor", the tragedy of the nation is revealed in a metaphorical way. Officials who are loyal to the party, whose every action is in line with the standard set by the Communist Party, who love their careers for life, and even the trustworthy people of the state who treat their wives and relatives according to their careers are all cripples of the former alliance. J. Orwell describes the creation of the world described by M.M. Dost as follows: “The world of fear, treachery, and suffering is a world that is becoming more and more merciless, not merciless. Progress in our world is an increase in suffering. Previous civilizations claimed to be built on love and justice. Our civilization is built on hatred ”[1; 253].

When Yakhshibaev saw the professor laughing in Lolazor, his teeth fell out when he learned to laugh, and he lost his teeth when my friend Sharif died. We ate at the funeral that day. when he said, "first we offer our condolences to the widow, then we forget," and then someone else's words, "I will not go, I hate her, I will hate her even after she dies." [2; 26]. These two works, which date back half a century according to the time of creation, are in fact a continuation of each other. The predictions made in the first will happen in the second. The purpose, operation, and essence of the policy of the totalitarian regime have been interpreted in the same way by the writers of the two nations, the two social systems, both inside and outside the prisons of the peoples.

O’Brien says, “There will be no feelings of fear, anger, victory and self-disintegration in our world. We lose everything else. All of them. We will forget the previous way of thinking - the pre-revolutionary era. We have severed the bond between parent and child, between man and woman, between one man and another. We have done so that no one trusts his friend or his wife. ”[1; 253] Given that 100 of the 137 prophecies in Orwell’s books have been fulfilled, our

confidence is heightened that he is as uniquely gifted as the great prophet Nostradamus. Such predictions of masters of artistic expression are not new to history. Suffice it to recall Jules Verne's prophecy about the Titanic. There seems to be an extraordinary inner power in the true creator, an awareness of world events far above grounded perceptions. The possessors of the word (Navoi) who have the power to give life to the dead are people who are unlike others, because creation itself is in fact a heavenly phenomenon. The prophecies of Navoi and Mashrab about their own deaths also confirm our opinion.

Orwell's writings also took place one after the other in the former Soviet state for a long time. During the years of repression and the second post-war famine, people lost faith in each other, and everyone became afraid of each other. From sumalak to blessings for the dead, from funerals to wearing robes and skullcaps, everything was forbidden. As the writer says, anger, fear, self-destruction, the loss of language, religion, faith, entered the way of life of the nation. No one was able to resist, the protesters were shot and persecuted. The girl hears this and sells her father. This event is just a page of the history of our people.

We see the same reality in "Lolazor" in the image of Kurbanoy, Avvalbek. The victim is an ordinary girl who buys pistachios on the street and becomes an advanced picker at the request of adults. He is actively involved in the cotton-picking machine during the harvest season, and with the assignment of his superiors, the press turns him into a star. There is only one happiness, one goal for the Sacrifice, who recognizes neither the land, nor the family, nor the child, and he must always be clothed in glory. Kurbanoy, who is separated from his several children, abandons the unborn baby and joins the mausoleum in the cotton picking machine, because the task of the party is more important to him than his one and only child.

"The Barn" depicts Stalin's bloody and horrific policies, and tells the story of a new lie that forcibly instills the words of truth and equality in the minds of the people and puts pressure on the world. The narration reveals the eternal victory of the strong over the weak, the cunning over the simple, and the evil over the good. The work was banned in the West for two years, until 1945, and was not even allowed to be published in England or America.

In European literature, methods of expressing the supernatural reality in the language and style of the dystopian novel have been studied. This is very important and necessary, because a number of foreign critics (R. Warx, A. Kettle, I. Howe, M. Hodgart, etc.) consider dystopia not as a uniquely valuable artistic phenomenon. It should be noted that these ideas, the critical attitude of literary critics, apply to both the content and the form of the novels. Indeed, J. The language of Orwell's novels is characterized by a certain dryness, false science, lack of vivid figurative means and stylistic devices. Some of the "colorlessness" of the images is primarily explained by the writer's inner atmosphere of the art world. Moreover, in relation to these views, this can be explained by the general scientific problem of the novel. The author, who prioritizes science, convincingly proves that scientific and technical achievements have a direct impact on individuals and society in general. In a technocratic society, its main features are community, similarity and stability, and as an integral property of human nature, language does not change and inevitably changes as a "pillar" of a well-oiled mechanism, that is, a man who has become a bolt of society. He disintegrates himself as he loses his inner 'I', degenerating as a person. In the author's image he makes extensive use of expressive means and various stylistic devices, which is why the novel "1984" differs from other works in this direction. The author's style of writing can be described as impressionistic, with the use of mathematical imagery, metaphors and symbols in the creation of an image of the future being the basis for such a conclusion.

Observing the peculiarities of the writer's uniquely colorful images and portraits shows that he creates the character in a sketch, welding each impression with a strong tattoo and great speed. In general, the analysis of the text of the novel allows us to highlight the following features: the original exposition, that is, the reader is introduced into the world of everyday reality of the non-imaginary situation from the first lines. Typically, such a style is a very convenient and effective way to quickly introduce the reader to the artistic world of the work. When it comes to social science fiction or dystopia, which uses fiction as an artistic medium, this is even more necessary because the authors of fantasy works are meant to create a special world by modeling a special reality that is unfamiliar to the reader. Moreover, at the plot level, such an exposition implies the social and temporal stability of all the described societies, their own system of government, their own laws and orders, and the synthesis of different styles. In our opinion, J. Orwell's purpose in applying such experiments is to present to the student's mind, subconsciously, several alternative variants of reality - an artistic image of "existing," "possible," and "necessary." J. Orwell articulates his ideological goal through the extensive use of individual neologisms that do not cover the description of the daily lives of people in the world of dystopia, but reflect their unique characteristics. This explains why many new words that do not exist in the language are used in his works. The writer chooses the method used in the works of fiction to form an idea of the environment, spirit, its ideology and politics of the future society, and through these words the reader easily adapts to the spirit of the work. The reader quickly realizes a fact that is unfamiliar to him and participates in building the artistic world of the protagonists. On the other hand, their use is closely related to the problem of modeling artificial language, which is designed to shape the thinking and behavior of the population of dystopia. [1; 284-295] Many new language words, such as "Tinchvaz", "Haqvaz", "ishkun", "muhvaz", still do not appear in any oral or written form of any language in the world, such terms are specific only to this work, only to the lexical layer of this novel.

When analyzing a writer's authorial language, several approaches are possible. One of them is functional, i.e., the work being studied is based on the tasks of the genre in which it is written, as Orwell is sometimes involved in journalism in addition to the various genres of fiction, and sometimes the journalistic spirit predominates. In the Orwell style, the rigidity of statements, the figurativeness of images, the methods of giving the impression of contrast, the proximity of paradoxes, biblical words and phrases to oral speech (in one or adjacent sentences), words that must be understood in a completely different sense, unexpectedness, contradictions of ideas (same or two sequences) -sentence) is observed. It should be noted that J. Orwell's style and language are unique, and its scientific study, the study of the author's work from a linguistic point of view is of great importance for translation studies and provides important conclusions.

One of the leading principles in prose in the current literary process is the appreciation of psychology as the main tool in depicting man in all its aspects, in different situations and in different situations - from different angles. Prominent representatives of world literature A. Dante, M. de Servantes, Pushkin, M.Lermontov, F.Dostoevskiy, L.Tolstoy, M.Bulgakov, F.Kafka, A.Kamyu, L.Andreev, J.Joys, H.Hesse, L.Borxes, E.Xeminguey, J Orwell, the study of the works of ChingizAitmatov, confirms that in the works of these writers, artistic psychology is manifested in various ways and means.Our national prose writers A.Qodiriy, Cholpon, A.Qahhor, Oybek, O.Yakubov, P.Qodirov, Sh.Kholmirzaev, O.Mukhtor, M.M.Do'st, H.Do'stmuhammad, N.Eshonqul, E.Azam, Sh. It can be observed that this tradition, that is, artistic psychology, as a method of interpretation in the coverage of the creative concept, is more deeply reflected in the prose works of Butaev, U. Hamdam. This means that psychology has a special place in the development of national prose.

Any artistic expression of the text is distinguished by the fact that it has a certain literary impact on the spiritual-psychological world of man, as well as in the oral or written style. Even if any work of art becomes a perfect work of art, it cannot capture the heart of the reader, it cannot fulfill its most important function - its aesthetic function. The real life of a work of art comes to life only when the spiritual intimacy with the reader begins, acquires a receptive essence. J. Orwell accomplishes two important purposes through the literary text. Firstly, it turns the fate of its protagonists in a completely different direction through more words than events, and secondly, it does not seek the reader, on the contrary, the heart of the reader who captures this novel is shaken, because this work embodies all human problems.

The means of artistic image and expression (portraits, psychological landscapes and details) and "things that are not connected with the world of objects, which are not clearly visible - to express the psyche of the characters" [3, 8] in the novel "1984" , at home, in a dream show, the writer draws the reader closer and closer to himself. The expression of the psyche of the characters is interpreted as a characteristic of style, sometimes of figurative content, or of formal-semantic quality. As a result, it is difficult to come to a firm decision on this issue. In fiction, the writer's skill reveals the spiritual world of the protagonists, or more precisely, the most subtle, most mysterious feelings that run through their hearts.

We see that it is very important to study the creative individuality, poetic form and style of creativity in the works of the artist, the creation of a literary hero and the skills of artistic analysis and research of the psyche of characters on the basis of an integrated literary process. Because the portrayal of a person as a perfect person, a full representative of society, a citizen who has his own views and understands his rights, an active member of society who is not indifferent to his fate, is done for a specific purpose. The essence of this goal should be to build a democratic society, the protection of human rights through the rule of law. This is the main idea of the novels analyzed by J. Orwell and M. M. Dost. The writer's style is evident in the realization of his ideological goal by various means, such as inner monologue, portrait, dialogue, landscape. In 1984, the protagonists are taken to the outskirts of the city, to the church, while in Lolazor, NazarYahshibaev invites Muhsina and his friends to the mountains, the writer takes his friend to the mountains, the dream of creating a garden, his friend's desire for a garden and regretting his garden's neglect. The world is revealed. Multi-layered images represent the novel characters 'attitudes toward the world and man, to the news happening in their own hearts and in society. The construction of the mill in the "barn", working in the fields, taking the sheep to the pasture outside the barn, and the story "Return to Galatepa" depict the steppe, farming, a courtyard surrounded by thick trees, based on the ideological purpose of the artist. All of the above cast a figurative character, helping the reader to understand the spirit of reality.

An examination of Orwell and M.M. Dost's novels reveals that each novel is completely new in style and essence as it interprets time and space, but in both novels the human problem is the main theme, and this is natural. It can be said that the emergence of new means of interpretation in modern Uzbek novels is not only the result of the literary influence of our writers, but also in the legitimacy of the artistic interpretation of social thinking. A. Kadyri's "Last Days", Cholpon's "Night and Day", Oybek's "Navoi", O. Yakubov's "Diyonat", P. Kadyrov's "Starry Nights" introduced our national novel to the world, while Murod Muhammad, created in the literature of independence, Dost's novels "Lolazor", T.Murod's "Fields left by my father", H.Dustmuhammad's "Market", L.Burikho's "People in the heat" novels renew the form and content of Uzbek literature. Literary critic H. Karimov explains this as follows: "It is natural that a change in human thinking is influenced by changes in time and society, which, in turn, determines the right direction of society, reflects its place and status in life and attracts human attention. This is reflected in Uzbek novels. This means that it is not the events themselves, but

the person himself, his thoughts, pains, sufferings, psyche, psychological world that lead, describe and reveal them ”[4, 83].

The works "Return to Galatepa" and "Barn" do not generalize the human personality, but describe each person as a separate role. Because one of the conditions of existence is self-possession, although the destinies of people who do not repeat each other sometimes resemble each other in the example of society or cattle, there is also an individuality in their way of life that belongs only to themselves.

It is noteworthy that the novel "1984" combines the psychological interpretation of the feelings of the heart, soul and mind in the places where such heroes as Winston, O'Brien, Julia, Goldstay are interpreted. The unity of content and form ensures methodological integrity and determines the level of artistry of any work. [5; 82]. The writer often seeks to reveal both the psychological and social nature of the character of the protagonist. We see that Winston’s mutual rapprochement with Julia was not just for fun, but his observations about the tyrannical totalitarian regime that bound them together. Thought brings them closer together, unites two people who aspire to each other because of a spiritual need, a strong hatred for society.

It is known that the style of each writer depends on the nature of talent, creative image, way of thinking, way of expression, attitude to literary traditions. Each artistic element in the non-fiction novel "1984" shows the uniqueness of the writer's style, revealing the peculiarities of the character of the protagonist, as well as a synthesis of social relations, the analysis of the impact of political reality on the characters.

George Orwell's 1984 and The Barn are stylistically complex and written in an unconventional way. In modern terms, they are masterpieces of the modernist style of their time.

It is in this spirit and style that the peculiarities of works are so common in world literature before George Orwell. For example, J. Joyce's "The Adventures of Wellis", F. Kafka's "Process", A. Camus's "The Stranger", M. Bulgakov's "Seeds of Disaster", "Ityurak", "The Master and Margarita", L. Andreev's "Judas Iscariot". In the Uzbek national literature, which artistically synthesizes the modernist traditions of world literature, new approaches to reality are also reflected. Its first buds were "Return to Galatepa or happy Gaybarov" by MM Dost. It can be seen in the works "Lolazor", "Resignation", "Mustafa". Later, this unconventional prose, a relatively complex style, appeared in various forms in the works of T. Rustam's "Game of Butterflies", H. Dostmuhammad's "Jajman", N. Eshonqul's "Coffin", O. Mukhtor's "Fu", "Plato".

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APPLICATION OF INNOVATIVE METHODS IN THE PREPARATION OF CHORUS CONDUCTOR

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ABSTRACT

At present, the attention and need for the chorus is becoming more and more important in our cultural and educational life. Education is rising to a high technological level, the development of new pedagogical technologies continues, which is primarily due to the idea of the integrity of the pedagogical process. At the heart of this article lies the main task of training a, to form a muscular freedom of students, to cultivate a holistic personality who is passionate about their profession, striving for self-improvement.

KEYWORDS: *Professionalism, Creative Approach, Conducting, Individual, Potential, Innovation, Chorus Conductor.*

INTRODUCTION

In the middle stage, the system of training choirmasters in the specialty "Choir Conducting" is individual, there are no classes with the choir directly in the classroom. Often the exercises are of an associative nature, with the ability to express and control the chorus sound. In the process of training conductor choirmasters, modern science makes extensive use of various musical and pedagogical technologies, the use of which serves to develop and diagnose the professional and personal qualities necessary for the future career of the student.

In particular, the Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021 states that deepening and increasing their social activity in the development of civil society.[1]The modern pedagogical process is inconceivable without the widespread use of new information and communication technologies. Great interest in modern computer systems is the motivational basis for educational activities. It is information technology that is the basis of modern education and guarantees the required level of quality, variability, stratification and individualization of teaching and education.

Computers are a valuable source of bibliographic and encyclopedic information in the preparation of lectures on special education, such as music teaching methods, choral literature, choral studies. Types of computer music curricula used in the course include: electronic textbook, electronic music encyclopedia, library information retrieval systems.

Computer programs are also used in the development of musical ability, while in the study of choral parts exercise programs that determine the height of the graphic to control the purity of vocal intonation are indispensable. References, which contain audio files of musical works, allow you to listen to the studied choral works. Programs that allow students to type and edit a musical text in choral arrangement, prepare a vocal work for publication on piano accompaniment, prepare a score for a vocal or instrumental ensemble of any composition are indispensable. A computer that uses television equipment can also act as a "simulator" for transmission. Teachers can use a variety of knowledge control programs to master the subject.

Game technology is widely used in specialty training, with a focus on communicating with other participants, collaborating, coordinating their actions, sharing knowledge, expanding and deepening it. You can organize classes in groups in the classroom. One of the founders of the Kazakhstan School of Opera and Choir, Professor Jamanbaev B.A. suggests organizing classes in groups from the first year of study. Such classes have a number of advantages: the educational and pedagogical tasks set by the teacher with the participation of students will be effective in nature; the mistakes of one are taken into account by the others and corrected more quickly and efficiently; solidarity among students, "frienda special psychological climate is created that shapes the "sense of belonging", mutual support and community involvement.

Group sessions allow conducting exercises not under the piano, but in a vocal ensemble composed of the students themselves, where each of them works as a choir member and choirmaster. Along with the formation of willpower qualities that play a major role in the conducting profession, the principles of personal development in the team are being successfully implemented. The role of students in analyzing specific situations together is to reflect on their actions, analyze failures, record positive moments, and develop a new syllabus for the lesson.

Problem-based learning technology shapes the relationship between the composition being studied and other related phenomena of music and art culture. The performance of the same work by different choir groups is compared and analyzed by the students. In the classroom, you can use the "elegant text" method, its simpler modifications - "partial text justification" and "text processing". All of this is done by the dynamic recordings that the student has to make, or he or she adds detailed additional comments to the score, encrypts and concretizes the proposed authorial version of the play, and creates his or her own performance plan. A detailed study of musical material and the use of specific terminology places the need for the student to constantly refer to dictionaries and other reference books, which, in turn, leads to a more meaningful study of musical material. The student's activity is focused on solving the problem when he or she sees the conditions necessary to overcome it.

Developing a scenario of a musical event for school students as part of practical or extracurricular activities, selecting and designing works on the repertoire, leads to project learning technology.

Choral work analysis technology leads to a collaborative design and prediction process of choral cycle work. The analysis includes: general information about the authors of the music and the artistic text; musical theoretical analysis taking into account the basics of the musical text; vocal-choral analysis with the study of overcoming difficulties in performance; to analyze the idea of the conductor of the authors of the work, taking into account the image.

The problem of maintaining and strengthening the health of students has been around for a long time and requires the use of health-saving technologies in teaching choral singing. Music therapy is becoming a world-renowned science today. Song is a powerful means of balancing the nervous system, psyche, prevention of diseases of the vocal apparatus and respiratory organs, has a beneficial effect on the broncho-pulmonary system, kidneys, and massages the throat, thyroid

gland, heart. A large load is massaged diaphragm, intercostal muscles, abdominal muscles, resulting in internal organs.

In the choir class work, “Respiratory Gymnastics” recreates the respiratory stereotype created as “a method of treating diseases associated with voice loss.” "Articulation gymnastics", "intonation-phonetic exercises" of V. Yemelyanov'sphonopedic method of voice development; Caring for purposeful and proper development is an integral part of the choir class.

Music-pedagogical technologies not only help to develop the professional and personal qualities of the student, but also optimize the learning process, making it interesting and flexible. This does not mean that a lesson in conducting class should become fun for students, but that if the student is interested in the results of their work and the learning process itself engages the student, self-improvement a socially successful person is formed.

Each teacher of the “Choir Conducting” cycle discovers new exciting opportunities in their professional activities using modern innovative technologies in the context of modernization, as in the process of training a choirmaster, as a result of which for the teacher - work, and for students - learning becomes more cognitive and engaging.

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A REVIEW OF A HEART DISEASE PREDICTION SYSTEM BASED ON DATA MINING AND HYBRID INTELLIGENT

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ABSTRACT

Heart disease is one of the leading causes of death across the globe, and it is critical to detect the illness early on. The doctor may use computer-assisted tools to anticipate and diagnose cardiac problems. The goal of this study is to raise awareness about heart-related cardiovascular illness and to provide a short overview of current decision support systems that use data mining and hybrid intelligence methods to forecast and diagnose heart disease.

KEYWORDS:*Cardiovascular Disease, Data Mining, Decision Support System, Hybrid, Intelligent System.*

4. INTRODUCTION

The heart is a major muscle organ in humans that pumps blood via the circulatory system's blood vessels [1]. The correct functioning of the heart is essential for human survival. The heart's dysfunction will have an impact on other areas of the human body, such as the brain and kidneys. When blood circulation in the body is poor, it affects both the heart and the brain. Blood arrest in the heart is often referred to as an attack, whereas blood stoppage in the brain is referred to as a stroke. The proper functioning of the heart and brain is vitally necessary for human existence.

4.1. Cardiovascular Disease:

For both men and women, cardiovascular heart disease is one of the leading causes of mortality. The phrase "heart disease" refers to a variety of heart-related medical disorders that describe irregular health problems that directly stimulate the heart and all of its components[2]. Table 1 lists the many kinds of heart-related cardiovascular illnesses and their descriptions.

TABLE 1. TYPES OF CARDIOVASCULAR DISEASES [3]

Heart-related cardiovascular diseases	Description
Acute coronary syndromes	Blood-supply to the heart muscle is swiftly obstructed
Angina	Chest pain due to a lack of blood to the heart muscle
Arrhythmia	Atypical heart rhythm
Cardiomyopathy	Heart muscle disease
Congenital heart disease	Heart disfigurements that are present at birth
Coronary heart disease	Arteries supplying blood to heart muscle becomes obstructed
Heart failure	Heart is not propelling ample blood
Inflammatory heart disease	Tenderness of the heart muscle and/or the tissue
Ischaemic heart disease	Plaque builds up inside the coronary arteries
Rheumatic heart disease	Rheumatic fever
Valvular disease	Disease of the valves

Table 2 lists several risk factors and their symptoms that lead to a heart attack.

TABLE 2. RISK FACTORS AND SYMPTOMS OF HEART ATTACK[4]

Risk factors	Symptoms of Heart Attack
• Age • Angina • Blood cholesterol levels • Diabetes • Diet • Genes • Hypertension • Obesity • Physical Inactivity • Smoking • Work stress	• Chest Discomfort • Coughing • Nausea • Vomiting • Crushing chest pain • Dizziness • Dyspnoea (shortness of breath) • Restlessness

4.1.1. Prevalence of Heart Disease:

According to global life expectancy, India is the 39th most vulnerable country to coronary heart disease in the world. The mortality rate per 100,000 in India is 138.36[5]. Table 3 shows the number of people in India with coronary heart disease by age, gender and location.

TABLE 3. CORONARY HEART DISEASE IN INDIA BY AGE, GENDER AND REGION[6]

Year/Age	20-29	30-39	40-49	50-59	Male	Female	Urban	Rural
2000	4.51	5.48	6.11	5.81	12.9	14	12.3	14.7
2005	6.15	7.25	8.33	7.71	17.1	18.7	17.8	18
2010	8.31	9.09	10.9	10	22.4	24.5	24.6	22.2
2015	10.4	12.4	14.3	13	28.7	32.7	36	25.4

The following table shows that in a nation like India, women are more likely than males to suffer from coronary heart disease. Until 2010, the population of India's rural regions suffered from coronary heart disease at a higher rate than the urban population, however this trend has reversed after 2010. In 2015, there was a significant difference in the number of people suffering from CHD in rural and urban areas.The following is the format of the paper: Section 1 is an introduction that covers cardiovascular disease and its prevalence. The advantages of employing a decision support system to predict cardiac illness are discussed in Section 2. Sections 2 and 3 discuss several data mining and hybrid intelligence techniques for predicting cardiac disease. Finally, Section 3 brings the paper to a close.

5. DISCUSSION

In India, the population between the ages of 40 and 49 is severely affected by heart disease. In the past fifteen years, the number of people suffering from heart disease has increased across all age categories. Coronary heart disease in India by age, gender, and region is shown in the graph below.

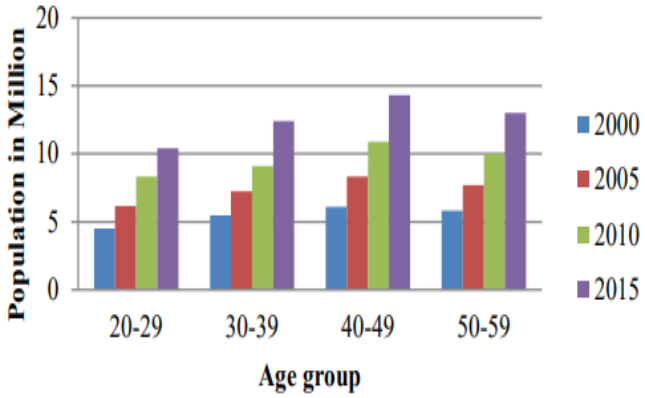

Figure 1. Illustrates the Coronary Heart Disease in India by Age[7]**.**

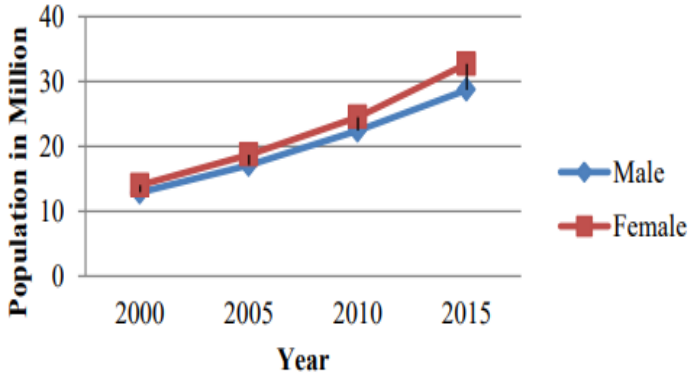

Figure 2. Illustrates the Coronary Heart Disease in India by Gender[7].

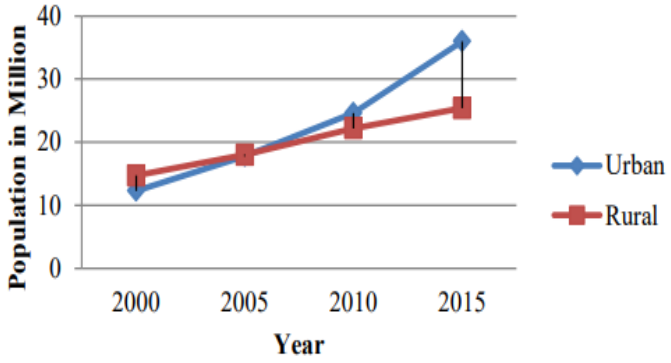

Figure 3. Illustrates the Coronary Heart Disease in Urban and Rural India[7].

5.1. Decision Support System (DSS) for Heart Disease Prediction and Diagnosis:

The use of computer-based systems and algorithms that make judgments at the right stages may help enhance medical diagnosis. Decision support systems are the name given to such systems (DSSs). Intelligence has a part in this as well. Based on patient data and domain expertise, these systems may assist anticipate and diagnose illness. DSS aids in the improvement of healthcare quality by delivering accurate and reliable diagnosis. DSS may minimize treatment costs by delivering a more precise and quicker diagnosis, as well as saving time when compared to conventional treatments. Any health organization may use these services after they've been uploaded to the cloud.

5.1.1. Knowledge Discovery in Database:

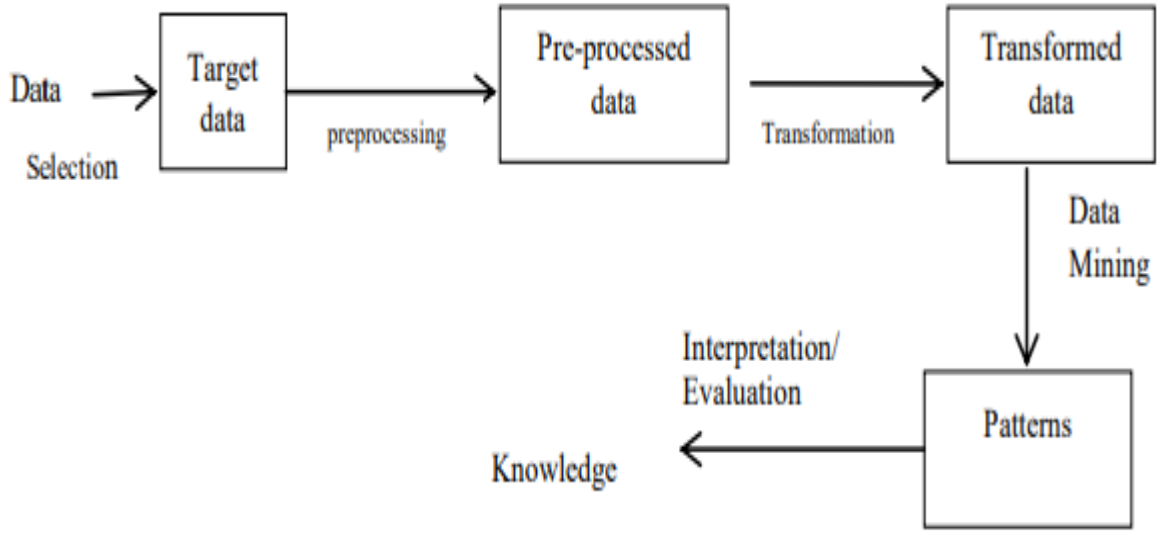

Figure 4. Basic database knowledge discovery technique

A knowledge base was used to create decision support systems. The data mining method collects valuable information from a data collection and converts it into a suitable structure for future use in database knowledge discovery. To uncover hidden patterns and connections from huge datasets, data mining combines statistical analysis, machine learning, and database technology. Data mining is the process of extracting implicit, previously unknown, and possibly valuable information from data recorded in a database in a nontrivial way. There are two types of learning methods used in data mining: supervised and unsupervised learning. In supervised learning, a training set is utilized to learn the model parameters, while in unsupervised learning, no training set is needed.

5.1.2. Data Mining Algorithms:

- *Neural Networks (NN):*

A neural network is a parallel, distributed information processing structure made up of a large number of processing units known as nodes that are linked together by unidirectional signal channels known as connections. Each processing element has a single output connection that branches out into many connections, each of which transmits the same signal. According to how they learn, the NN may be divided into two categories. There are two types of learning: supervised and unsupervised.The network computes a response to each input in supervised learning and compares it to the goal value. If the calculated answer does not match the goal value, the network's weights are adjusted using a learning rule. Single-layer perceptron and Multi-layer perceptron are two examples of supervised learning. Unsupervised learning allows networks to learn by recognizing unique characteristics in the issues they are presented with. Self-organizing feature maps are an example of unsupervised learning.

- *Naïve Bayesian Classifier:*

The Bayes theorem-based Nave Bayes classification method generates a probability by measuring the frequency of values and combinations of values in historical data. The Bayes theorem calculates the likelihood of an event happening given the probability of a previous occurrence.

Pro(B given A) = Pro(A and B)/Pro(A)

This method has the advantage of using just a minimal quantity of training data to estimate the parameters needed for classification.

- *Decision Tree:*

A decision tree is a framework that may be used to break down a big collection of data into smaller groups of records using a series of basic decision rules. The members of the resultant sets grow more and more similar to one another with each division. One of the decision tree models that generates a decision tree from a given set of training cases is ID3 (Iterative Dichotomiser 3). C4.5 is the most recent version of the ID3 induction method, C5.0 is an extension of the C4.5 decision tree algorithm, and J48 is the ID3 algorithm's implementation.

- *Genetic Algorithm:*

Genetic Algorithm is a search method in Artificial Intelligence that employs natural selection. Genetic algorithms use methods including inheritance, mutation, selection, and crossover to solve optimization and search issues. A typical genetic algorithm necessitates a genetic representation of the solution domain as well as a fitness function to assess it.

5.2. Surviving Techniques for Prediction of Heart Disease using Data Mining:

It is suggested to develop a Web-based clinical decision support system that utilizes medical profiles such as age, blood pressure, and other factors to forecast the likelihood of individuals developing heart disease. The Nave Bayes Data Mining technique responds to complicated what-if scenarios. The system is built on the PHP framework, which is adaptable, dependable, and extensible.By analyzing previous researcher's results, a study on various data mining methods used for the prediction of heart disease showed hybrid approaches to be the best prediction model compared to single models.

TABLE 4. ILLUSTRATES THE COMPARISON OF HEART DISEASE PREDICTION SYSTEM USING DATA MINING CLASSIFICATION TECHNIQUES[8]–[11]

Reference	Data Mining Techniques Compared	Accuracy Obtained		Number of Attributes used	Result: Best technique
Purusothaman G *et al* (2015)	Single data mining models: Decision Tree	76%			Hybrid model
	Associative Rules	55%			
	K-NN	58%			
	Artificial Neural Networks	85%			
	Support Vector Machine	86%			
	Naïve Bayes	69%			
	Hybrid models	96%			
Srinivas K *et al* (2010)	Decision Tress (C4.5)	82.5%		15	Neural networks (MLP)
	Neural networks (MLP)	89.75			
	Naïve Bayes	82%			
	SVM	82.5%			
Chaitrali S *et al* (2012)	Decision Trees	96.66%	99.62%	13 &15	Neural networks
	Naive Bayes	94.44%	90.74%		
	Neural Networks	99.25%	100%		
John Peter T *et al* (2012)	Naïve Bayes	83.70%		13	Naïve Bayes
	Decision Tree	76.66%			
	K-NN	75.18%			
	Neural Network	78.485			
Hlaudi DM *et al* (2014)	J48	99.0741%		11	J48, REPTREE and SIMPLE CART algorithm
	Bayes Net	98.148%			
	Naive Bayes	97.222%			
	Simple Cart	99.0741%			
	REPTREE	99.0741%			
Gnanasoundhari SJ *et al* (2014)	Naive Bayes	52.33%			Weighted Associative Classifier
	Neural network	78.43%			
	Weighted Associative Classifier	81.51%			
	Support Vector Machine	60.78%			

Author assessed three data mining methods, including Decision Tress (C4.5), neural networks (MLP), and Nave Bayes, using accuracy and sensitivity as metrics. The results show that neural networks and Nave Bayes perform better than Decision trees when there are more characteristics. The top performers are neural networks, which have a classification accuracy of 0.897 and a sensitivity of 0.9017. The effectiveness of several decision tree algorithms used for heart disease categorization and prediction, such as ID3, C4.5, C5.0, and J48, has been investigated. ID3 is a decision tree model that uses a fixed set of training examples to create a decision tree. C4.5 is the most recent version of the ID3 induction method, C5.0 is an extension of the C4.5 decision tree algorithm, and J48 is the ID3 algorithm's implementation. The author also included attribute selection criteria, such as information gain, Gini Index, and Gain ratio, as well as performance assessment criteria, such as sensitivity, specificity, and accuracy.Because the heart dataset includes huge volumes of data that take longer to classify, attribute selection techniques are used to decrease the dimensionality of the data. The Nave Bayes classification method improved the outcomes in both instances. When the performance of four classification algorithms: Nave Bayes, Decision Tree, K-NN, and Neural Network is compared on a full and reduced heart disease dataset, this is seen.

5.3. Surviving Techniques for Prediction of Heart Disease using Hybrid Intelligent:

For predicting cardiac disease, a genetic algorithm and fuzzy logic methods are employed, with the genetic algorithm doing feature selection and the fuzzy logic performing classification and prediction. Using measures such as accuracy, specificity, and sensitivity, the authors compare the

performance of the suggested approach (GAFL system) with that of the fuzzy entropy-based method (NNTS). The suggested method's accuracy is 86 percent, and the number of characteristics is decreased from 13 to 7.In this paper, we propose an Intelligent Heart Disease Prediction System based on CANFIS and Genetic Algorithm. The neural network, fuzzy logic, and genetic algorithm are all used in this model. The suggested model improves training efficiency and classification precision.

The authors proposed a novel classification method for cardiac disease that incorporates Artificial Neural Networks and feature subset selection. The number of characteristics is reduced when feature subsets are selected. Principal Component Analysis is used for pre-processing (PCA). The results show that the suggested method outperforms conventional classification approaches in terms of accuracy.Gupta et al.'s goal is to utilize a genetic algorithm to determine the weights of neural networks and to compare and contrast two kinds of learning algorithms: the Feed forward neural network algorithm and the Fitting algorithm[12]. By using datasets on Feed Forward ANN model, Fitting ANN model, and GA trained Feed Forward ANN model, GA trained Fitting ANN model, and the author validated the accuracy to be 97.75 percent and the improvement of Feed-forward and Fitting neural networks to be 1.29 percent and 1.37 percent, respectively.

Three data mining classification methods (Decision Trees, Naive Bayes, and Neural Networks) are utilized, as well as two additional characteristics: obesity and smoking, as well as a set of 13 consistent attributes. We utilized the J48 decision tree algorithm, which utilizes the pruning technique for tree construction, and the data mining application Weka 3.6.6. When comparing the accuracy of classification methods with 13 and 15 input characteristics, the findings indicate that neural networks provide correct answers. The accuracy is improved using Multi-layer Perceptron Neural Networks (MLPNN).The cerebrovascular illness is classified using artificial neural networks and the back propagation error technique. The neural network was trained with 16 input characteristics using a back propagation method on one hidden layer with a sigmoid function to enhance accuracy.

6. CONCLUSION

There are many decision support system that use different methods to predict heart disease. According to global data on life expectancy, heart illness is becoming increasingly prevalent. As a result, it is essential to develop a cost-effective, intelligent, trustworthy automated system that correctly predicts cardiac disease based on symptoms, gender/age, and domain expertise of experts in the area.

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THE IDEA AND SENSE BEHIND VARIOUS TYPES OF LOGIC GATES

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ABSTRACT

One of the most essential components of an electronics device is the logic gate, which performs an action between two or more inputs and produces just one logical output. In this article, we present a circuit that employs a bipolar junction transistor in conjunction with seven logic gates: AND, OR, NOT, NAND, NOR, XOR, and XNOR. The circuit is constructed by using two digital signals as input terminals, labeled "A" and "B." With each individual logic gate, this approach will reduce individual circuit use. The primary benefit of this article is that it simplifies circuit design due to the usage of a bipolar junction transistor in this project. The logic gates are electrical devices that implement a Boolean function and create a single logical output by conducting logical operations between two or more inputs, according to this article. In this logic gate, the digital signal enters via the input signal and leaves through the output signal. A logic gate has two inputs and one output terminal in general, but the input signal may vary and include many signals.

KEYWORDS:*Bipolar Junction Transistors (BJT's), Integrated Circuits (Ics), Diode, Zener Diode.*

1. INTRODUCTION

Logic gates are electrical devices that implement a Boolean function and generate a single logical output by performing logical operations between two or more inputs. The digital signal enters via the input signal and exits through the output signal in this logic gate. In general, a logic gate has two inputs and one output terminal, although this input signal may change and may contain more than two signals. However, there is a NOT gate that has just one input and one output and works in binary terms[1].

The data is not gated in such a way that if the input signal is active high, the output signal is active low. We can combine as many logic gates as we need to build the circuit to get circuits like flip flops, multiplexers, latches, counters, and so on. We can improve the circuit's efficiency by integrating this logic gate and designing it with bipolar junction transistors.[2].

1.1 Types of Logic Gates in the Circuit:

AND: An and gate is a simple digital logic gate that operates according to the truth table, with "0" representing the low signal and "1" representing the high signal. The AND gate's job is to determine the lowest value between two binary digits. With the implementation of logical conjunction, if the input A has a low signal, i.e. "0," and the input B is likewise low "0," the output Y will be low "0," according to the truth table in Figure 1 [3].

When input A is a low "0" and input B is a high "1," the output Y is also a low "0." If one of the inputs is low and the other is high, the output will stay low; but, if both inputs are high, i.e. input A is high "1" and input B is likewise high "1," the output will be high "1." With the logical function, we can state that if the input is high, the output will be high[4].

INPUT A	INPUT B	OUTPUT Y = A.B
0	0	0
0	1	0
1	0	0
1	1	1

Figure 1: The above figure represents an AND logic gate and truth table which represents the function of the gate.

OR: The OR gate is a digital logic gate that operates on the basis of logical disjunction. The logical OR gate's primary purpose is to determine the greatest value between two binary digits. [5]. According to the truth table (Figure 3), if both inputs A and B are low "0," the output will be low "0," but if either input is high "1," the output will be high "1." For example, if input A is a high “1” and input B is a low “0,” the operation Y = A+B will produce a high signal (Figure 2)[6].

Figure 2: An OR gate logic circuit with two input digital signal and one output digital signal.

INPUT A	INPUT B	OUTPUT Y = A+B
0	0	0
0	1	1
1	0	1
1	1	1

Figure 3: The above table is an OR gate truth table. It shows the functionality of the circuit.

NOTE: The logic gate NOT is basically a single input inverter which changes the input digital signal data "1" to an output digital data "0" and when the input data is "0" then the output is "1" (Figure 4). It performs the inverted or complementary function as a logical operation so NOT gate is commonly known as inverter because of its inverting functionality. The inversion is indicated as the bubble symbol on the output terminal of the logic gate (Figure 5)[7].

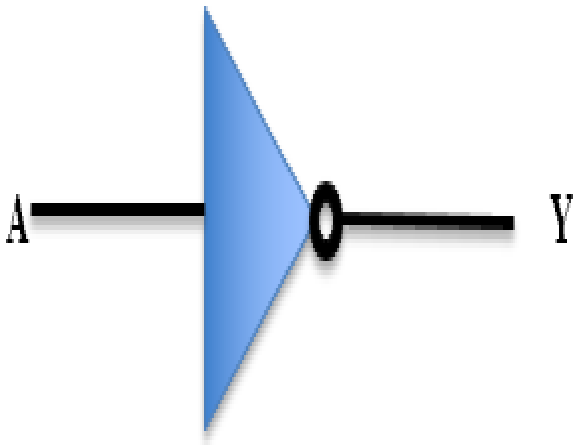

Figure 4: A NOT gate logic circuit which has only one input and output terminal. The output result is the compliment of the input signal.

INPUT A	OUTPUT Y = $\overline{A}$
1	0
0	1

Figure 5: The table shows the functionality of the NOT logic gate, which gives the compliment result of an input signal.

NAND: The NAND gate is a combination of the NOT gate and the AND gate in digital electronics. It generates a complimentary value of the outcomes, for example, if the inputs A and B are both low "0," the and gate will conduct a logic conjunction first, and the output will be low "0" (Figure 6). Because the NAND gate is a combination of NOT + AND, as we said in the first paragraph, the NOT gate produces the complementary of the outcomes[8].

As a consequence, we may claim that the NAND gate enhances the performance of the and gate inside it. Only if all of the inputs are high will the output result be low, and only if any of the inputs are low will the output result be high. De Morgan's theorem is used to create a NAND using a transistor and a junction diode, with two input NAND gate logic defined as Y = A+B, and then the NOT gate operation is used to make it equal to an inverter (Figure 7)[9].

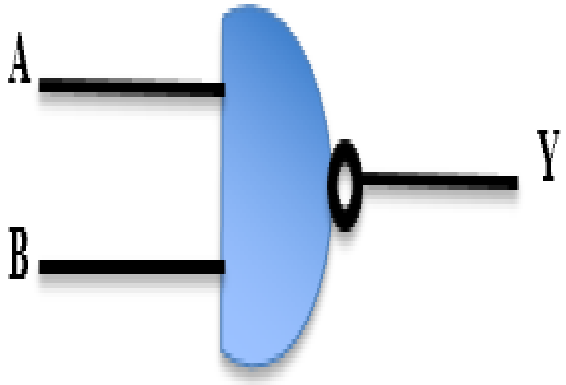

Figure 6: A NAND gate logic circuit which performs the result with combination of NOT gate + AND gate.

INPUT A	INPUT B	OUTPUT Y = $\overline{A.B}$
0	0	1
0	1	1
1	0	1
1	1	0

Figure 7: The above table represents the functionality of the NAND logic gate which fulfill the result with the combination of NOT + AND gate.

NOR: The NOR gate is a logic gate that combines the NOT and OR gates. A bubble is attached to the NOR gate's output terminal, which acts as an inverter. When both the input and output are low or negative, it produces a positive outcome, i.e. a high output. Like the NAND gate, the NOR gate is sometimes known as the universal gate because it may be used to create any logic gate (Figure 8). To begin with, when any of the input digital signals is high, the output will be high, but the NOR gate acts as an inverter, complementing the output data produced by the OR gate. With the logical operating function of the gate, however, when both the input digital signal and the output digital signal are low, the output will be high (Figure 9)[10].

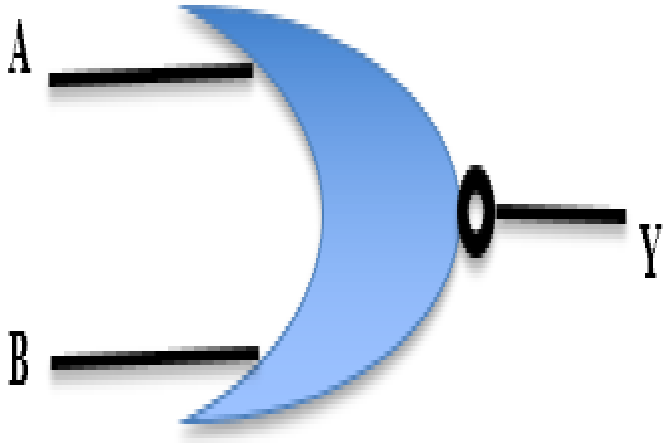

Figure 8: A NOR gate logic circuit which performs the result with combination of NOT gate + OR gate.

INPUT A	INPUT B	OUTPUT $Y = \overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

Figure 9: The above table represents the functionality of the NOR logic gate which fulfill the result with the combination of NOT + OR gate.

The Figure 10 shows the overall combination of the various types of logic gates with their expression equationwhich shows the AND, OR, NOT, NAND and NOR gates expression and symbol.

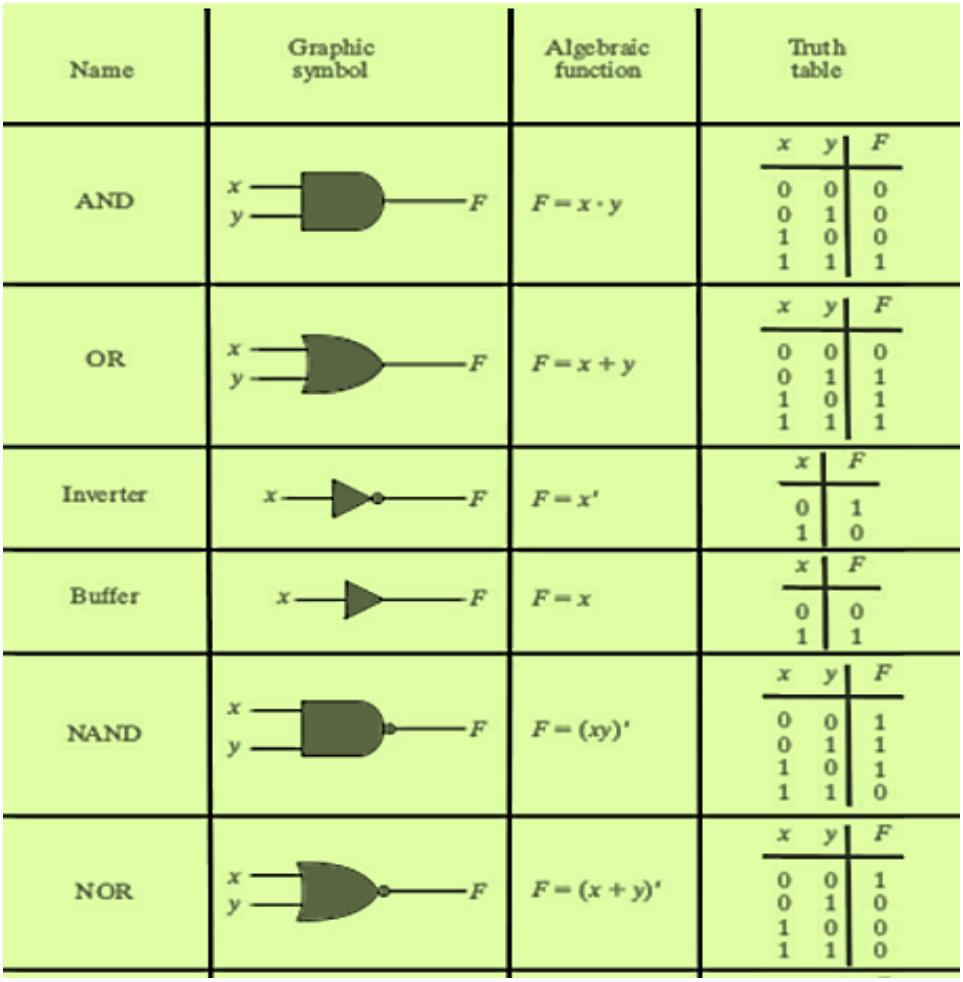

Figure 10: The Overall Combination of the Various Types of Logic Gates with their Expression Equation

REVIEW OF LITERATURE

Mallampati Krishna Prasad et al. devised a bipolar junction transistor (BJT) circuit that provides output for four logic gates, including AND, NAND, OR, and NOR, by accepting two inputs, "A" and "B." They previously created a circuit with just one circuit for each logic gate, but now they have developed a new circuit with four logic gates in a single circuit. They were able to reduce the size of the particular circuit using this approach. They utilized a single IC for all four logic gates instead of four ICs for four logic gates so that the space taken up by the other three circuits might be used for something else. To make the circuit simple to build, this project utilized six bipolar junction transistors [2].

Ashutosh Ghosh et.al studies Picric acid (PA) is a severe water contaminant at low concentrations. Aside from that, aliphatic alkali metals (AAs) add to the list of pollutants that contaminate surface water. There are many reports available to identify PA with an extremely low detection limit (LOD). However, only a few efforts have been shown to identify AAs.

A novel fluorescent donor-acceptor molecule with intrinsic intramolecular charge transport (ICT) has been synthesized, allowing for the selective and sensitive colorimetric detection and quantitation of PA and AAs in nonaqueous and aqueous solutions with low LODs. A hemicyanine skeleton with two pyridenylmethylamino groups at the donor end and a benzothiazole moiety just at acceptor end is used to make the synthesized chemical. Spectroscopic explanations and computational assistance are provided for the detailed processes

and reaction kinetics. The detecting compound's fluorescence characteristic emerges as result of PA protonation of its pyridinyl centers, which causes quenching of fluorescence and subsequent de-protonation by AAs, which restores the signal. By using consecutive interactions, we were able to create logic circuits using the collected optical responses.

Guinevere Strack et.al studies Boolean logic processes are shown using biochemical organisms. AND, OR, XOR, with InhibA were created utilizing soluble chemicals as chemical "devices" as well as the enzymes oxidase (GOx), glucose dehydrogenase (GDH), alcohol dehydrogenase (AlcDH), and microperoxidase-11 (MP-11) as input signals to the logic gates. The enzyme were utilized as both solvent molecules and biocatalysts that were immobilized. The technologies under investigation are thought to be a first step toward the development of "smart" message materials with constructed Boolean logic.

DISCUSSION

This paper discusses about the logic gates which states that the Logic gates are electronic devices that implement a Boolean function and produce a single logical output by performing logical operations between two or more inputs. The digital signal enters through the input signal and exits through the output signal in this logic gate. In general, a logic gate has two inputs and one output terminal, although this input signal may change and may contain more than two signals. However, there is a NOT gate that has just one input and one output and works in binary terms.

An and gate is a simple digital logic gate that operates according to the truth table, with "0" representing the low signal and "1" representing the high signal. The AND gate's job is to determine the lowest value between two binary digits. With the implementation of logical conjunction, if the input A has a low signal, i.e. "0," and the input B is likewise low "0," the output Y will be low "0," according to the truth table.The OR gate is a digital logic gate that operates on the basis of logical disjunction.

The logical OR gate's primary purpose is to effectively identify the maximum between two binary digits.The NAND gate is a combination of the NOT gate and the AND gate in digital electronics. It generates a complimentary value of the outcomes, for example, if the inputs A and B are both low “0,” the and gate will conduct a logic conjunction first, and the output will be low “0.” Because the NAND gate is a combination of NOT + AND, as we said in the first paragraph, the NOT gate produces the complementary of the outcomes. The NOR gate is a logic gate that combines the NOT and OR gates. A bubble is attached to the NOR gate's output terminal, which acts as an inverter. When both the input and output are low or negative, it produces a positive outcome, i.e. a high output. Like the NAND gate, the NOR gate is sometimes known as the universal gate because it may be used to create any logic gate.

CONCLUSION

In this paper we can conclude that with the combination of all the logic a circuit is designed which perform all the task using single circuit where in all the gates can perform at the same time or can perform one after another as per the requirement. The main aim of this paper is to reduce the space which was needed for each circuit for each logic gates. And the most important thing is now the users don’t have to remember the ICs number that which IC is required to perform which task. They can easily perform the task by using the single circuit.

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A STUDY OF GENETIC DIVERSITY IN AGRICULTURAL ANIMALS

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ABSTRACT

The domestication of livestock animals, as well as a lengthy history of migrations, selection, and adaptability, has resulted in a vast array of breeds. Demographic characterization, documentation of production settings, and efficient data administration are all necessary for the maintenance of these genetic resources. Furthermore, molecular genetic investigations enable the assessment of genetic diversity between certain breeds, as well as the reconstruction of breed and ancestral population histories. Cattle, yak, water buffalo, sheep, goats, camelids, pigs, horses, and chicks have all been summarized. Developments in molecular technology are anticipated to aid future development. Nowadays, the breed serves as the conservation unit. Breeds, on the other hand, are social entities that play a role in regional and national identity, leaving space for subjective assessments of their distinctiveness. Breed distinctiveness isn't always apparent from molecular data. These consistently indicate that the breeds share the majority of the variety, with the majority of them harboring a significant portion of the species' overall diversity.

KEYWORDS:*Databases, Domestication, Farm Animal Genetic Resources, Genetic Diversity, Livestock, Production Environment Recording.*

INTRODUCTION

Animal domestication was a crucial stage in the demographic and cultural evolution of humans. It provided the groundwork for modern agriculture, along with the breeding of plant species. The

major evolutionary processes of mutation, artificial selection, adaptability, isolation, and biological evolution have produced an immense variety of local populations throughout the following history of cattle. This has resulted in the development of numerous well-defined breeds utilized for a number of reasons with varying degrees of performance in recent decades. The development of and increasing emphasis on more efficient selection programs has expedited genetic progress in a number of breeds during the past several decades. The spread of genetic material has been aided through artificial insemination and embryo transfer[1]. Furthermore, advances in feed technology have enabled optimum nutrition, and improved transportation and communication systems have resulted in homogeneous and tightly regulated production settings. As a consequence, high-yielding breeds have taken their position throughout the globe. Concerns about the eroding of genetic resources have grown as a result of this trend. Low-production breeds are deemed important for future breeding choices because their genetic diversity is likely to contribute to present or future characteristics of relevance. Comprehensive understanding of the breeds' features, including data on demographic size and structure, geographical distribution, the production environment, and manuscript and between-breed genetic variation, is required for effective management of farm animal genetic resources. Integration of these many kinds of data will result in the most accurate depiction of biological variety within and across breeds, allowing for more efficient FAnGR management[2].

The present level of knowledge on the assessment of biological diversity of the major farm animal species is reviewed in this paper. The sections on demographic characterization and recording of the production environment concentrate on data needs and describe the present status of data availability[3]. After that, there's a look at breed description databases, which briefly explains the data management architecture and highlights the many kinds of publicly available phenotypic and demographic data. For cattle, water buffalo, goats, sheep, horses, pigs, camelids, yak, and chickens, the section on genetic characterization in livestock briefly covers current information about domestication processes and breed variety at the global and local levels. A following section discusses the databases available for storing and managing molecular data. We end with an evaluation of the infrastructure required for thorough studies of global livestock variety, as well as future possibilities.

Characterization of the Population

Demographic data are essential for determining the risk status of livestock breeds, which is an important stage in FAnGR management's strategic planning. Several variables influence one's risk status. For starters, it is related to the population's size and structure. The recommended metric for determining risk status is effective population size, which is calculated using the magnitude of both the female and male breeding populations. Knowing the Ne enables one to estimate the rate of inbreeding and, as a result, the loss overall genetic diversity within a population. Second, risk status is determined by present and anticipated demographic patterns. A fast downhill trend, for example, suggests a high degree of danger. The population's geographical distribution is the third important element to consider. A population that is more concentrated is more susceptible to localized catastrophes, such as disease outbreaks, than a population that is more dispersed. The demographic statistics collected at the national level must be viewed in the perspective of the breeds' worldwide demography. A subspecies that is widespread in other nations is likely to have a lesser conservation priority in the United States. Knowing if a particular national breed is genetically unique or part of a broader population distributed across many nations is a fundamental need. Breeds found in just one country are classified as local breeds, while those found in several countries are classified as transboundary breeds, with the latter being further divided into regional and international transnational breeds depending on the degree of their occurrence[4].

Information can be gathered at least once every generation of the animal in issue, especially for breeds designated as endangered: about 8 years for horses and donkeys, 5 years for cattle, buffalo, sheep, and goats, 3 years for pigs, and 2 years for poultry species. The contraceptive technique being utilized has an impact on the necessary frequency, which should be documented as part of the monitoring procedure. Even while demographic data is available for many breeds, especially in poorer nations, it has not been updated in a long time. The techniques used to gather the data have an impact on their dependability, but the expenses must also be considered. Textual data detailing breed distribution that has been input into DAD-IS is being transformed into georeferenced dimensions; more thorough dereferencing is considered as a priority as element of the deployment of established production environment descriptions[5]. The development of techniques for statistically representative of national animal populations in order to determine their overall population numbers and other census characteristics in a cost-effective way is one of the key problems for the future.

Production Environment Recording

Many elements of FAnGR management need descriptions of breed production settings. They may be used to infer breed traits based on the premise that exposure to various climates, feed supplies, and diseases has resulted in genetic variations in adaptability to environmental circumstances through time[6]. For meaningful assessment and comparison of something like the performance of various breeds, a detailed description of the manufacturing environment is also required. More generally, a better knowledge of production settings – including socioeconomic factors like markets – may aid in the planning of future breed usage and development. While accounts of specific breeds' production settings may be obtained (with different degrees of concentration and depth), comparisons are difficult, and breeds are typically regarded in isolation from their manufacturing surroundings.

A production environment is split into two major areas in the proposed framework: the management environment and the natural environment. These areas are further subdivided into a criterion hierarchy. On global high-resolution maps, the majority of the measurements needed for the important ecological domain are already accessible. By combining these data with spatially distributed breed distributions, more detailed descriptions and analysis of the production settings will be possible.

Databases of Breed Descriptions

The creation of awareness via the distribution of knowledge is seen as a critical component in the conservation and use of genetic resources. As a result, a number of websites have attempted to address this problem, frequently from various angles. There are three types of databases to consider: To begin, breed organizations maintain webpages to explain their populations in order to promote their own genetic resources. The perceived strengths of a breed are highlighted, but they are not necessarily backed up by facts and statistics. The websites, on the other hand, provide a helpful and comprehensive overview of a certain group of breeds, sometimes with pictures, but their reach may be restricted due to the usage of the national language[7]. It contains information on the breed's history, the breed society, and a summary of the breed's recognized strengths, also including High Daily Weight Gains and Longevity. Again, a visually attractive presentation could get more attention than hard data. Third, there are just a few websites accessible on a global scale.

Because all FAO member nations have committed to submit their breed data to DAD-IS, now the FAO node of FABISnet, via their officially designated National Coordinators for the Management of Animal Genetic Resources, these information systems aim for real worldwide coverage. Unlike other databases, factual data is kept in over 200 clearly defined fields, enabling for more focused database searches[8].Cattle genetics Cattle genetics Cattle genetics Cattle

genetics Cattle genetics Ca Despite their total infertility, taurine cattle and zebu are traditionally regarded distinct animals. A comparison of the mitochondrial DNA of taurine and indicine cattle was one of the earliest contributions of DNA research to the reconstruction of cow domestication. Separate domestications, based on the separation of their control areas, most likely began about 8000 years BC in Southwestern Asia and the Indus valley, respectively. After the 7th century Arabian conquests, Zebus were most likely introduced into Africa. The finding that African zebus have taurinemtDNA suggests that African zebus are the offspring of zebu bulls and taurine cows (Bradley et al. 1998)[9]. The Y-chromosomal INRA124 microsatellite alleles (Hanotte et al. 2000), satellite DNA polymorphism, and AFLP patterns all correlate with the distribution of taurine, indicine, and mixed phenotypes (Nijman et al. 1999). Microsatellite genotypes enabled zebu migratory pathways to be reconstructed (Hanotte et al. 2002)[10]. The tsetse resistance of the native taurine breeds in West Africa prevents zebu introgression (Freeman et al. 2004, 2006b; Ibeagha-Awemu et al. 2004)[11]. Cattle were transported over from Spain and Portugal after the European discovery of America in 1492. Because of their adaptability to hot and arid circumstances, Indian zebu cattle were later transported to Central and South America. The Brahman zebu breed has taurinemtDNA, while the Brazilian Nellore and Gir have both taurine and indicine haplotypes. This is because mostly males were imported and crossed with Creole cattle. Domestic cattle in Southeast Asia and Indonesia are believed to have originated from a cross between zebu and Bali cattle, a domestic version of the banteng.

A demic spread of agriculture from southeastern to northern Europe is supported by autosomal proteins polymorphisms, microsatellite data, and AFLP fingerprinting. The connections between genetic and geographical distances for Mediterranean and Northern breeds are distinct; this is thought to represent independent Neolithic migrations between the Mediterranean coastlines and the Danube. A bigger collection of microsatellite data does show a distinct location for Mediterranean cattle, but it also separates transalpine cattle into two distinct breed clusters: Central-European and Northern European. AFLP data also revealed a distinct location for Central-European cattle. Surprisingly, the Northern-European cluster mainly corresponds to a high variety of milk protein genes, the distribution of human lactase persistence alleles, and Neolithic cow husbandry locations. This led to the hypothesis of cow and human gene-culture co-evolution.

- **Yak**

Yaks are a kind of bovine that may cross with taurine and zebu cattle to generate viable females but infertile males. It is a rare livestock species found in western China's Qinghai-Tibetan Plateau, Mongolian and Russian steppes, and other Himalayan nations. The yak's molecular markers and genetic studies are in the early stages of development. Both haplotypes were identified in a single, tiny wild yak population, indicating that domestic Chinese yaks are descended from a single wild gene pool. In Qinghai and Tibet, a domestication event was believed to have occurred in the early Holocene, approximately 10 000 years before present (YBP). There was no discernible pattern of phylogeographical distribution of main clades in Chinese yak samples collected from various locations in south-western and north-western China. An examination of domestic yak samples from all yak-keeping nations, including China, Bhutan, Nepal, India, Pakistan, Kyrgyzstan, Mongolia, and Russia, discovered a third, less common haplogroup. A single domestication on the Eastern Qinghai-Tibetan Plateau was followed by a westward migration through the Himalayan and Kunlun mountain ranges, and a northward migration through the South Gobi and Gobi Altai mountains to Mongolia and Siberia, according to geographic clines in haplogroup diversity.Mongolia's Gobi Altai, south Gobi, and north Hangai communities, as well as Mongolia's Hovsgol and Russia's Buryatia people, are closely connected. As a result, these populations should be treated as separate genetic units for conservation and fertility purposes. The study of paternal lineages is now possible because to

cross-species multiplication of bovine Y-chromosome unique markers. A full yak mtDNA genome sequence, as well as numerous bovine SNPs that are also polymorphic in yak, will help researchers fully appreciate the genetic makeup of yak populations.

- **Water Buffalo**

Domesticated water buffalo The Indus and Yangtze valley empires are believed to have cultivated Bubalusbubalis. Based on physical, behavioral, and geographic characteristics, water buffalo have traditionally been classified into swamp and river buffalo. River and swamp buffalo will indeed mate if they are raised together from calfhood, and although first-generation hybrids are fertile, it is unknown if fertility will be maintained in future generations. Bubalusbubalisbubalis and Bubalusbubaliscarabenesis are two distinct subspecies of Bubalusbubalisbubalis. River buffalo are more morphologically similar to wild buffalo than swamp buffalo. Swamp buffalo may be found around Southeast Asia as well as China. Although certain regional communities have local names but have been proven to vary in appearance and environmental adaptability, there are no recognized breeds (Chen &Zu 2004). The Indian subcontinent, as well as Southwestern Asia and the Mediterranean nations, are home to river buffalo. In Africa, South America, and Australia, buffalo have just lately been imported.In East India and Bangladesh, the geographical habitats of river and swamp buffalo overlap. Although Sri Lankan buffalo resemble swamp buffalo in appearance, studies of chromosomal number, microsatellites, and mtDNA reveal that they are river buffalo. The genetic difference between river and swamp communities is on par with that between well-known breeds of these other domestic animals.

- **Sheep**

Sheep are one of the oldest pastoral animals, having been domesticated in Southwestern Asia. Relationships with ancestral species have been explored using mtDNA data, as has been done with other domesticated animals. Two haplogroups A and B were discovered, both of which were distinct from sequences found in any current Ovis species. Haplogroup B is carried by the European mouflon, although it is a wild version of early European domesticates. Sheep are most likely descended from one or more Asiatic mouflons. A number of studies have looked at the geographical distribution of haplotypes. Although Haplotype C is uncommon, it has been discovered in Portugal, Turkey, the Caucasus, and China. Haplotype D is linked to the A haplotype and is found in Rumanian Karachai and Caucasian animals. Haplotype E, which lies halfway between A and C, is similarly uncommon, having been discovered in just two Turkish animals. But even though the sheep haplogroup divergence is less severe than the taurine–zebu split, this mtDNA diversity with different haplogroups is similar to what's out there in goats and cattle. In addition, unlike taurine cow haplotypes, the sheep haplogroup has no correlation with regional origin. Distinct maternal lineages in the predomestic population may represent various areas of origin, but another apparent option is the coexistence of several maternal descendants.Another instructive retrovirus copies can be found in most other European breeds, indicating that wool-producing sheep arrived later. This research also discovered a genetic connection between English Jacob sheep and Asian or African people. Although many organizations have investigated the variety of sheep as indicated by microsatellites, little information into the connection between breeds has been gained.

- **Pigs**

By tracking mtDNA, molecular data has given insight on pig domestication. Initial mtDNA analyses indicated that European and Chinese pigs were domesticated separately from European and Asian wild boar subspecies, but subsequent research found that at least seven domesticated episodes took place throughout Eurasia and East Asia. These investigations also indicated that Asian domestic pigs were introduced into certain European breeds in the 18th and 19th centuries.

Demonstrated that domestic pigs of Near Eastern lineage were brought into Europe during the Neolithic period, as well as the domestication of the European wild boar. Once domesticated, European pigs quickly displaced imported domestic pigs from the Near East throughout Europe.Wild and domestic populations were discovered to be linked in both areas. Southwest Asian, African, and American pigs were most closely linked to the Population using all three marker types, while East-Asian mtDNA and Y-chromosomal haplotypes were found in East-African and Nicaraguan groups. Mixed European-Asian origins may be found in Anglo-Saxon, African native pigs, and particularly international breeds.

DISCUSSION

The foundation for future breeding programs is genetic diversity in characteristics of interest. Within a species, genetic variations across individuals, families, and populations show variation. Within the past century, there has been a clear loss of these genetic resources across all farm animal species. Efforts to conserve genetic resources have been countering the loss of genetic resources during the past two decades. As a consequence, significant progress has been made on two fronts. For starters, there is an increasing quantity of data about cattle breeds and their environments that has been carefully gathered. Second, numerous breeds in most livestock species have been subjected to DNA studies. As a consequence, many papers have been produced, ranging from descriptions of local populations to more systematic analyses of worldwide diversification trends. Both phenotypic and molecular findings are available in databases, with the ultimate goal of providing an integrated platform for scientific analysis and decision-making. The present condition of the databases, on the other hand, leaves a lot to be desired. Furthermore, phenotypic data recording and molecular genotyping, while valuable in their own right, must nonetheless converge on consistent and reasonable conservation values for particular breeds.

CONCLUSION

The molecular project-specific databases mentioned in this article have out-of-date information. Database updates, both primary and project-specific, are often overlooked. A second issue resulting from the presence of many project-specific databases is that searches across projects are not feasible since each database has its own design and therefore distinct report formats and export capabilities. As a result, combining data from several databases is time-consuming. This issue may be solved by keeping all data in a single database or by establishing a database search engine that can perform searches across many databases. This is only possible if the project-specific databases meet certain structural criteria that the scientific community must decide on and follow while creating them. This system, which provides search results from a variety of different databases, has been successfully deployed for plant genetic resources on a national basis. New technologies like as high-throughput SNP typing or even whole-genome sequencing are expected to change our knowledge of breed variety and uniqueness in the near future, with the ultimate goal of learning more about the genetic foundation of functional variation.

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A REVIEW PAPER ON CLIMATE CHANGE AND FOOD SAFETY

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ABSTRACT

Climate change and variability may affect the incidence of food safety risks at different levels of the food chain, from basic production through consumption. Changes in temperature and precipitation patterns, increasing frequency and severity of severe weather events, ocean warming and acidification, and changes in pollutants' transport routes are just a few of the ways climate-related variables may affect food safety. Climate change may have an impact on socio-economic elements of food systems including agriculture, animal production, global commerce, demography, and human behavior, all of which have an impact on food safety. This article examines the possible effects of projected climate change on food contamination and food safety at different levels of the food chain, as well as adaptation methods and research priorities for dealing with climate change's food safety consequences. In order to better understand the changing food safety situation and create and execute adaptation strategies to address growing hazards linked with climate change, the study suggests that intersect oral and international collaboration is required.

KEYWORDS: *Climate Change, Food Control, Food Safety, Microbiological Contamination, Plant Health.*

1. INTRODUCTION

A number of variables, including global commerce, socioeconomic and technical growth, urbanization, and agricultural land usage, influence food safety.Climate change and variability are only two of the many variables that may alter the type and incidence of food safety risks. Climate change may have direct and indirect effects on the incidence of these risks at different

levels of the food chain, from primary production through consumption[1].Changes in temperature and precipitation patterns, increasing frequency and severity of extreme weather events, ocean warming and acidification, and changes in the transport routes of complex pollutants are just a few of the ways climate-related variables may affect food safety[2].

Temperature rises and variations in rainfall patterns have an effect on the persistence and patterns of occurrence of bacteria, viruses, parasites, and fungus, as well as the patterns of foodborne illness outbreaks. Changes in microbial ecology and growth, plant and animal physiology, and host susceptibility may result in the emergence, redistribution, and changes in the incidence and intensity of plant and animal diseases and pest infestations, all of which may have an impact on foodborne diseases and zoonosis. Climate change and variability, in this context, represent a threat to pest and disease management methods such as Good Agriculture and Good Veterinary Practices, potentially resulting in chemical residues in the food chain[3].

Pathogens, chemicals, and other dangerous substances originating from sewage, agriculture, and industrial settings may contaminate soil, agricultural areas, water, food, and animal feed because of extreme weather events such as floods and droughts. Water and food cleanliness are particularly important in emergency circumstances after natural catastrophes.The biochemical characteristics of water, as well as water microbiology, fisheries distribution, fish metabolic rates, and persistence and patterns of fish, are all affected by ocean warming, climate change-related acidity, and changes in ocean salinity and precipitation.Pathogenic vibrios, harmful algal blooms, and chemical contaminants have been found in fish and shellfish. Climate change and variability may affect other underlying drivers of food safety, such as agriculture, crop production and plant health, animal production and animal health, fisheries, aquaculture, food trade, food and feed manufacturing, processing and handling, and consumer behavior, in addition to the relatively direct impacts of climate change on food contamination and foodborne diseases. These effects have far-reaching public health, economic, social, and environmental implications. A better understanding of all the changes that may occur because of climate change and variability is the first step toward ensuring preparedness for emerging food risks[4]–[9].

1.1 Climate change and food safety impacts:

Because there are so many unknowns, the connections between climate change and fluctuation and food contamination, food safety, and foodborne illnesses are very complicated. This section examines the effects of climate change on food microbiological and chemical contamination, as well as related foodborne illnesses, including the possible effects of climate change on bio toxins such as marine toxins and mycotoxins production and contamination.

1.1.1 Microbiological food contamination and associated foodborne diseases:

Climate change has the potential to affect all three components of the epidemiologic triad (host, agent, and environment).

Climate change impact:

- The transmission sources and modalities.
- Pathogen development and survival in the environment, as well as microbial ecology.
- Among other things, the food matrix.

1.1.1.1 Diarrhoeal symptoms and climate factors:

Diarrhoea is one of the most common causes of illness worldwide, and it is climate-sensitive, with significant seasonal changes. In Peru, higher temperatures were shown to be significantly linked to an increase in diarrhoeal illness episodes in adults and children, with diarrhoeal complaints increasing by 8% for each degree of temperature rise. There have also been reports of links between climate-related severe weather events and monthly reports of infectious water-borne illness epidemics across the globe. Following floods, populations with inadequate sanitation infrastructure and high infectious disease loads can suffer an upsurge in diarrhoeal illnesses such as cholera, cryptosporidiosis, and typhoid fever[10].

Following flooding events, increases in waterborne and foodborne diarrhoeal illness have been recorded in India, Brazil, Bangladesh, Mozambique, and the United States, and are expected in Mexico and Taiwan. The number of instances of gastroenteritis linked with rising temperatures in Australia was predicted to increase dramatically over the next century, according to a climate change scenario research.Salmonellosis, campylobacteriosis, vibriosis, listeriosis, various bacterial infections, parasite infections, and viral diarrhoeal syndromes are among the foodborne diarrhoeal illnesses that have been highlighted as a priority for more regular surveillance because of changing climatic conditions.

1.1.1.2 Bacterial pollutants and foodborne illnesses:

Climate change has the potential to affect all foodborne pathogens and illnesses linked with them (ECDC, 2007). In Europe, Canada, and Australia, time series analysis research on the effects of climate change on foodborne illnesses have mostly focused on salmonellosis and campylobacteriosis.

- **Salmonellosis:**

In average, incidences of salmonellosis rose by 5–10 percent with each one-degree rise in weekly temperature, for ambient temperatures over approximately 5 C, according to a time series analysis research on human salmonellosis in various European countries. Because of climate change, increases in the incidence of salmonellosis of approximately 2% are anticipated in Ireland in the next decades. In Canada and Australia, a link between rising temperatures and salmonellosis outbreaks has also been discovered.According to a climate change scenario research conducted in Australia that projected results until 2100, the number of cases of gastroenteritis would grow over the next century owing to an increase in cases caused by Salmonella and other bacteria. In places like Adelaide, a 1 degree Celsius increase in weekly mean maximum temperatures may result in 7% more Salmonella illnesses. Temperature has a consistent impact on Salmonella throughout a wide variety of nations and locations.

When compared to infections produced by Salmonella Typhimurium, infections generated by Salmonella Enteritidis seem to be more sensitive to the effects of ambient temperature. There seems to be a link between an increase in human salmonellosis and an increase in temperature in the week leading up to the disease's start, suggesting that improper storage temperature and food handling may be significant contributors in the disease's transmission.

- **Campylobacteriosis:**

The Climate Change and Adaptation Strategies for Human Health Time Series Analysis research looked at the effects of weather and climate change on campylobacteriosis in 15 European, Canadian, Australian, and New Zealand nations. Campylobacter infection peaks in most European nations in early spring (April or May), although not all countries follow this trend. The peak is in late June–early July in Canada. In comparison to New Zealand, seasonality is less

apparent in Australian cities. Seasonal trends may vary depending on where you are in the country.

The impact of climate-related variables such as short-term temperature increases on human campylobacteriosis is unknown. Despite the apparent link between temperature and campylobacteriosis, time series investigations have shown that the impact is limited to temperatures between 5 and 10–15 C, which corresponds to the spring months. In contrast to the significant connection found between ambient temperature and Salmonella transmission, Skelly and Weinstein (2003) revealed that the link between higher ambient temperature and increased likelihood of Campylobacter transmission is at best modest. However, a recent Irish research projected a 3% rise in the prevalence of campylobacteriosis because of climate change in the future decades. Weather may influence a variety of possible transmission pathways for campylobacteriosis (water sources, avian activity, fly activity, and recreational contact).Clearly, further research is required to determine the effect of climate on Campylobacter transmission to people.

- **Vibriosis:**

Higher temperatures, sea level rise, severe precipitation, floods, and changes may influence water microflora, particularly pathogenic Vibrio spp., in water salinity. Warming of the ocean and changes in salinity have been shown to affect aquatic microorganisms like Vibrio vulnificus and Vibrio parahaemolyticus, important human pathogens typically transmitted through the consumption of molluscan shellfish harvested from warm southern estuarine waters along the US Gulf Coast. The consumption of oysters collected from northern seas related to higher mean water temperatures has resulted in a major change from occasional instances of V. parahaemolyticus to widespread outbreaks during the past 15 years. Over the past decade, a new V. parahaemolyticus serovar (O3:K6) has developed and expanded quickly across the globe, becoming pandemic in scope. Even though a clear link to global climate change has yet to be established, such fast alterations in the epidemiology of V. parahaemolyticus infection are noteworthy. Vulnificus, infection's worldwide epidemiology has also altered. For example, although most outbreaks are rare, a 1996 epidemic of wound infection and bacteraemia in Israel linked to a single isolate is noteworthy. This biotype of V. vulnificus seems to be a highly virulent hybrid that had been prevalent in brackish environments for years to decades before producing illness in 1996.

It was believed that variations in inland fish farm water temperatures aided the organism's development, increasing the risk of infection in people handling or eating fish produced in these waters. Following that, a time series study of air temperatures for the two decades covering 1980–1999 showed a statistically significant rise in summer temperatures, which peaked around the same time the organism was linked to human illness. While not conclusive, this data indicates that global climate change had a role in the development of this strain.

The greatest model for understanding the potential for climate-induced alterations in enteric pathogen transmission is Vibrio cholerae. Although modest amounts of the bacterium may be isolated from estuary waters all over the globe, the illness is only seen in a few places (mainly the tropics and subtropics). There are distinct epidemic peaks (which are often seasonal) followed by periods of relative quiet in certain regions. Cholera endemicity is thought to be caused by a complex interaction of environmental and biological variables. Temperature, salinity, iron content, and sunshine are all abiotic (environmental) variables that affect V. cholera toxin production as well as phytoplankton and zooplankton populations. The survival and growth of V. cholerae in the estuarine environment are influenced by a complex series of interactions. Although this is a simplified summary, it should be clear that even minor changes in these critical environmental factors, which are likely to occur as a result of climate change, can have

significant implications for cholera transmission, with the developing world bearing the brunt of the public health consequences. This is backed by a recent research that found that temperature and rainfall may help explain seasonal variations in the number of cholera cases in Bangladesh. The first and second peaks of infection seemed to be caused by low and heavy rainfall, respectively, whereas the winter trough was explained by low temperature

- **Other bacterial foodborne illnesses:**

Global climate change may have an effect on other bacterial causes of foodborne illness. Because many, if not all, foodborne bacterial pathogens may develop at room temperature, with quicker growth favored at higher temperatures, changes in ambient temperatures may also hasten pathogen proliferation throughout the production to consumption continuum, assuming all other variables stay constant. Enteric infections such as Clostridium, Vibrio, and Aeromonas spp. cause gastroenteritis, which seems to peak in the summer or have a positive connection with ambient temperature. Recent research in the United Kingdom, however, casts doubt on the role of temperature and climate change in the increasing frequency of these foodborne diseases in England and Wales.

1.2 Other zoonoses, animal health and veterinary public health issues affected by climatic factors:

One of the many variables driving the emergence and spread of animal illnesses, as well as the transmission of zoonotic infections from animals to humans is climate change. Other variables include ecosystem variety, function, and resilience, as well as changes in the livestock industry's organization, breeding, and husbandry cattle and animal products, as well as in international commerce. These elements are not mutually exclusive.Climate change has an impact on each of them.

1.2.1 Climate change and emerging zoonosis:

Climate-related modifications in protection against pathogenicity in the habitat, changes in migratory routes, carriers and vector, and shifts in forest environment may all raise the likelihood of developing zoonosis. Rift Valley fever, West Nile fever, tick-borne diseases, and non-zoonotic disease vectors like Blue tongue, African Horse Sickness, and African swine fever are examples of zoonotic and non-zoonotic illnesses whose proportion will be deeply affected by climate adaptation strategies and fluctuation.

1.2.2 Climate change impacts on animal health and veterinary publichealth: potential pathways:

Climate change may have an impact on animal health and veterinary public health issues in the following ways:

- An increase in animal illness susceptibility.
- An increase in the range or abundance of vectors/animal reservoirs, as well as the lengthening of vector transmission cycles.
- Climate change's impact on farming/husbandry practices (including the use of veterinary drugs).

1.2.2.1 Increase in animal susceptibility to disease:

Climate change may have a direct or indirect impact on animal disease susceptibility. Climate change influences animals' living circumstances, which may lead to parasite illnesses (such as worm infestation/affection and taenia), nutritional problems, sunstroke, and dehydration. Extreme cold, droughts, excessive humidity, or heat can predispose cattle to complex bacterial syndromes like mastitis, which may necessitate antibiotic treatment.Because their metabolic processes are affected by water temperature, salinity, and oxygen levels and their habitats are fragile, aquatic creatures are especially susceptible to climate change. Fish, especially shellfish, react to changes in their biological environment (predators, species interactions, and illness) as well as climatic fluctuations. A warmer climate is anticipated to cause difficulties in the aquaculture industry, such as increased disease susceptibility, especially in intensive systems.

1.2.2.2 Increase in the range or abundance of vectors/animal reservoirs and prolonging the transmission cycles of vectors:

Climate science ecological changes, such as fluctuations in precipitation and warmth, may substantially affect the range, periodicity, and occurrence of many pathogenic and vector-borne illnesses, due to the sensitivity of the vectors and animal hosts from these diseases to climatic variables. Climate warming will have a significant impact on vector-borne and rodent-borne illnesses, as well as animal micro parasites, and may lead to novel transmit modes and host species alterations.

Fast developing opportunistic agents, conveyed by rapidly reproduced, highly mobile, and habitat generalist vectors, are expected to be vector-borne diseases that react most quickly to climate change. Takeover by exotic vector-borne viral illness will be especially dangerous for temperate nations.

1.2.2.3 Impact of climate change on farming/husbandry practices:

The effect of increasing heats on agricultural practices and the reactions to them are expected to vary across the globe. Heat-resistant livestock breeds may be utilized, although this modification could increase vulnerability to diseases. More livestock may be brought inside in certain regions in order to escape heat and stress, increasing the spreading of infection. Higher temperatures, on the other hand, may lengthen the grass-growing season in certain regions, allowing for more widespread cattle grazing and increased exposure to vectors and animals, according to the FAO.

Modifications in livestock breeding methods (e.g., intermingling or cramming of food - producing animals) in reaction to natural disasters or climate-related changes may enhance disease transmission, resulting in higher pathogen loads in faces and increased corpse contaminants. Increased usage of veterinary medicines owing to the spread of animal illnesses because of climate-related changes may lead to higher and perhaps inappropriate amounts of animal source in animal sources. This may have ramifications for public health and commerce.

2. DISCUSSION

The author has discussed about theClimate Change and Food Safety,Changes in temperature and precipitation patterns, increasing frequency and severity of extreme weather events, ocean warming and acidification, and changes in the transport routes of complex pollutants are just a few of the ways climate-related variables may affect food safety. Temperature rises and variations in rainfall patterns have an effect on the persistence and patterns of occurrence of bacteria, viruses, parasites, and fungus, as well as the patterns of foodborne illness outbreaks. Changes in microbial ecology and growth, plant and animal physiology, and host susceptibility may result in the emergence, redistribution, and changes in the incidence and intensity of plant and animal diseases and pest infestations, all of which may have an impact on foodborne

diseases and zoonosis.The Climate Change and Adaptation Strategies for Human Health Time Series Analysis research looked at the effects of weather and climate change on campylobacteriosis in 15 European, Canadian, Australian, and New Zealand nations.

3. CONCLUSION

The author has concluded about the climate changes and the food safety,Food safety concerns may be affected by climate change and fluctuation at many stages of the food chain, from fundamental production through consumption. Climate-related factors may impact food safety in a variety of ways, including changes in temperature and precipitation patterns, increased frequency and intensity of extreme weather events, ocean warming and acidification, and changes in pollutant transport pathways, to name a few. Agriculture, animal production, worldwide commerce, demography, and human behavior, all of which have an effect on food safety, may be affected by climate change. The impacts of predicted climate change on food contamination and food safety at various stages of the food chain are examined in this article, as well as adaptation strategies and research objectives for coping with climate change's food safety repercussions. The research indicates that intersectoral and worldwide cooperation is needed to better understand the changing food safety situation and to develop and implement adaptation measures to meet increasing risks related to climate change.

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A LOOK AT THE SOCIAL-MORAL, PHILOSOPHICAL CONCEPTS IN THE WORLD OF SHAKESPEARE AND IN HIS WORK

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ABSTRACT

The article analyzes the socio-ethical and philosophical concepts of Shakespeare's period and his work, the connection of his works with ancient literature and Oriental art of speech, the scope of ideas and themes put forward in his dramas. It also discusses the situation in which Eastern philosophy is in harmony with Western culture, individual freedom, and social inequality.

KEYWORDS:*Drama, Social Inequality, Social Thinking, Enlightenment, Pathos, Emotion, Observation, Culture, Lust, Morality.*

INTRODUCTION

Three factors played a decisive role in the development of medieval literature. These are folk art, ancient culture and art, and the influence of the church. In particular, the role of folk poetry traditions is fragmentary. Labor songs, which are the oldest examples of poetry, went beyond customs and rituals in the middle Ages and formed as an independent literary genre. Although religious superstition and bigotry prevailed for a long time, it still did not quench people's natural desire for the blessings and joys of life.

The influence of ancient culture on medieval literature is reflected in Shakespeare's King Lear, Macbeth, Hamlet, Timon of Athens, Anthony and Cleopatra, Julius Caesar, Richard III, Richard II, and Henry IV. , Henry V, and King John.

In the development of English drama, the first examples of the literature of this nation appeared in the form of songs dedicated to the issues of labor, war, domestic life. Such songs, which embodied special events in the life of the people, became the basis for the creation of epic epics. In turn, they reflect the people's daily life, life mixed with joy and sorrow, dreams, hopes for the future, happiness, prosperity. In Shakespeare's dramas, positive heroes (Hamlet, Hortsio, Laert, Duncan, Banko, Macbeth, McDuff, and Lennox Seward) are embodied as brave, courageous, healthy, generous, always ready to help the oppressed, to sacrifice their lives for the motherland.

For example, in the world-famous "Romeo and Juliet", love is glorified as a high divine feeling. The brave, courageous Romeo, who sacrificed in the way of his love, is honored. In contrast, the

actions of cowards, traitors, unproven, ruthless, ambitious people (Claudius, Gertrude, Polonius, Macbeth, and Lady Macbeth) are ruthlessly exposed.

The play is characterized by the expression of events in folk epics, the courage of the noble Romeo, as well as the analysis of deep human feelings, qualities, friendship, devotion, which enhances the value of this artistic monument.

In turn, the drama "Romeo and Juletta" stands out among the monuments of art. Elements of realism and populism are reflected in the image and interpretation of positive images. The similarities between this work and AlisherNavoi's epic "Layli and Majnun" and the Uzbek people's epic "Tahir and Zuhra" can be seen in the character, intensity, power and aspirations of the heroes of both works. Both Romeo and Majnun are tragically killed because of the disagreement between the people, the conflict between them. At the end of the work, the conflict between the two tribes and two families at the top of the graves of the lovers ends. Romeo is shown in a highly dramatic pathos that Farhod is the victim of a lie.

The love, joy, devotion and betrayal sung in Shakespeare's works are the main themes of the playwright's work. They emphasize the psychology of the heroes. Among Shakespeare's plays, Romeo and Juletta stand out. It depicts human love and worldly events, and love is sung as a result of man's natural feelings. In the work of the playwright there are features of Eastern literature, such as the praise of beauty, the pleasures of life, the thoughtful inspection of life. In works that depict the evolution of human psychology in his heart, the protagonists make accusations against the period.

Literature, in fact, means the ascension from the nafs to the heart, from the heart to the soul, from the soul to the mystery, from it to the meaning and essence. In each of these "statuses" the talented writer sees the human personality in a new light and laughs at new changes. Shakespeare has achieved all this. Literary scholar I. Hakkulov emphasizes that one of the most attractive features of Shakespeare's drama is to show the true image of man in the "mirror" of emotions, to describe the struggles of desire and destiny in the language of the situation.

When thinking about literary influence, it is impossible not to remember Dante. The influence of Oriental literature on Dante's work was specially studied by N.Kamilov.

Dante's work was strongly influenced by Eastern literature. After the Me'rojnama and the Thousand and One Nights were translated into Spanish on the orders of King Alfonso X, various legends about the Prophet Muhammad's Meroj, Eastern poetry, played a major role in the development of secular European literature.

All this is not in vain.Because the influence in all areas was also strong in the literature department. It is acknowledged that the prose examples of Eastern word art in terms of etiquette and teaching had a great influence on European literature.

Panchatantra, written in Sanskrit in the 3rd and 4th centuries, had a strong influence on European literature in the middle Ages and the Renaissance in terms of genre, style and content. This collection of short stories, called Kalila and Dimna, was translated into Arabic in the eighth century, and then into Greek, Hebrew, Latin, Spanish, and other languages. Slovak scientist M. Galikakademik S. F. Relying on Oldenburg, he said: “Panchatantra is the second most widely circulated work in the book world after the Bible. He influenced the development of medieval and Renaissance literature to such an extent that it cannot be compared to any other example of Oriental literature.

Indeed, no nation can ever develop in isolation from others, creating its own special culture. The centuries-old cultural ties between East and West, especially the process in the Middle Ages and the Renaissance. Confirms the idea of happiness.

The homeland of the Renaissance movement is Italy. When we talk about the Renaissance, we should first focus on the main aspects of the literature of this country. One of the greatest masters of speech in the cultural development of mankind is Dante Alighieri.

The work that sealed Dante's name in eternity, The Divine Comedy, consists of 33 songs (poems). This epic is further divided into parts such as "Hell", "Araf" and "Paradise", which describe the three parts of the world. The songs are written in the form of tertsina, i.e. trinity.

Dante used allegory and symbolism in the medieval genre of "vision" to create the Divine Comedy. However, the plot of "Dorulbaqo" reflects not only religious views, but also important issues related to real life. The protagonist of this work is the author Dante himself, and the epic tells the story of his birth while alive, crossing the borders of the eternal world under the guidance of the spirits of the ancient Roman poet Virgil and his lover Beatrice. it consists of a nine-story depth. Sinful spirits suffer on those floors.The lower the rank, the heavier the punishment.

Dante, the first representative of the new age, in the fourth song of "Hell", the poet embodied great people who made an invaluable contribution to the development of science, art and literature. The traveling poet meets Eastern scholars, such as Homer, Aeschylus, Sophocles, Aristotle, Plato, Socrates, Pythagoras, Heraclitus, Democritus, as well as our great ancestor Ibn Sina. The next stage of the eternal world is described in the second part of the epic "A'raf", which is located opposite the globe. The ocean separates it from the ground. There is a high mountain on the island in the middle of the ocean. The mountain has seven steps, and as it passes over them, the rebellious slaves are cleansed of sins.

During the Renaissance, genius writers also flourished in Spanish, French, and English literature. Miguel Cervantes, author of Don Quixote, François Rable, author of Gargantua and Pantagruel, great playwrights William Shakespeare, and Christopher Marlowe are proof of our point. Under the influence of the socio-political events that took place in Western Europe in the XV-XVI centuries, advanced humanistic ideas were propagated in the literature due to the peculiarities of their historical development.

In general, one of the main features of Renaissance word art is that it has a realistic content in addition to the humanistic spirit. The creators adopted the ideas of the struggle for equality and justice from ancient sources. Influence on such features of ancient literature can be seen in the works of F. Rable, Cervantes, and many tragedies of Shakespeare and Marlo.

The positive heroes of Renaissance realism embody incomparable courage and bravery. The great humanists who defended the freedom of the individual also reflected the living spirit of the Renaissance by creating noble images who believed in their own power, the triumph of justice, fought for truth, and were pure in heart.

As far as the question of literary influence and connection is concerned, it is necessary to dwell on two contradictory but at the same time interdependent situations. We are talking about synchronous and diachronic effects here.

The Enlightenment did not consider the existing social systems and orders on Earth to be perfect. According to them, the unfavorable situation in society should be corrected or eliminated by the supreme power of man - the intellect, and ignorance should be removed from the mire of backwardness.Because although God created the universe, man has the freedom, the right, and the obligation to control it. That is why human creativity is so highly valued.

Proponents of this line have argued that human enlightenment is capable of leading the world to goodness, arguing that there is a harmony between "sociality" and "naturalness," "civilization," and "nature." Therefore, in the literature of this period, in general, in the arts in general,

emphasis was placed on strengthening the material basis of culture and enlightenment, and the struggle of the human child with the forces of nature and its victory in this process, the test of human thinking.

The importance of the main aesthetic views in the Enlightenment literature is explained by the fact that the educational features of art were directed to the reconstruction of society. The fact that the writers of the English Renaissance created political-philosophical novels, philosophical stories, dramatic works of political-moral content in the spirit of enlightenment confirms our opinion. Enlightenment writers saw literature as a tool of ideological struggle. They sought to exaggerate the courage, hard work and initiative of their positive heroes, as well as the idea of generosity. These features can be observed in the activities of major artists from different countries.

The Enlightenment opposed conditionality, artificiality, in the literature of classicism, and, unlike the classicists, appealed to the lives of ordinary people. Their innovation in literature was also evident not only in the expression of new ideas, but also in the expression of new forms. The enlighteners gave the existing shamails a unique look and a unique meaning. In particular, they raised the development of drama to a new level. Thus the demands of classicist drama on the higher (tragedy) and lower (comedy) genres were deviated from.

Representatives of this direction paid special attention to the description and analysis of the daily concerns and aspirations of the people. These qualities were vividly reflected in Shakespeare's work.

It is in the development of the novel and prose in general that a great step has been taken in the literature on theoretical and aesthetic issues due to the Enlightenment movement. New forms of epic genres appeared in fiction - educational-didactic novels, domestic novels, philosophical short stories, comic epics, etc., and thus unique methods of analysis of the human psyche were discovered.

Speaking of the great representatives of Enlightenment literature in Britain, it is worth mentioning the names of famous novelists of this country Daniel Defoe, Samuel Richardson, Henry Fielding, Tobayas George Smollett, Richard Brinsley Sheridan, poet Robert Byrns. In particular, Defoe enriched the treasury of world literature with his works about the traveler Robinson Crusoe. In the first of this series of novels, the writer tells of a man who landed on a deserted island and survived because of his mind, will, ingenuity, aspirations and hard work. , skillfully described his struggle for survival.

In general, this immortal work alone is enough for the great writer to take an eternal place in the history of world literature. Defoe, who introduced the novel genre into English literature and was one of the leading intellectuals of his time, was also well known as a publicist and researcher. His scientific, creative and literary activity is wide and varied. In addition to his numerous articles and pamphlets, the author has a number of works on philosophy, economics, history, pedagogy, statistics, geography, and medicine.

As a progressive writer of his time, Defoe Robinson Crusoe was able to incorporate both the most delicate emotions, qualities, and conflicting traits of the human child into his character. The longevity of the work can be explained by the fact that the breath of labor that changes nature and society is in the depths of the inscriptions.

After this work, written in 1719, Defoe wrote The Life and Adventures of the famous Captain Singleton, as well as a sequel to Robinson Crusoe's past.

"The Adventures of Robinson Crusoe" was translated into Uzbek by YuldashShamsharov.

The work of Jonathan Swift, a contemporary of Defoe, also plays an important role in English literature of the Enlightenment. He is one of the most famous critics in the history of not only English but also world literature. Swift's life and literary work cannot be imagined without turning a blind eye to the various political struggles of his time, the social realities of his native Ireland. The writer, who put the happiness of the people and the happiness of the homeland above the narrow interests of the ruling circles, took an active part in the struggle against the oppression of British colonialism, along with his patriotic colleagues for the freedom of the Irish people and country.

Although the play depicts mythical, fairy-tale-like events, it is primarily about human relationships, the intricacies of social life, political hypocrisy, and the ignorant real face of society. It ridiculed the ugly deeds and foolish customs of the rulers and those around them. This novel, which reflects the characteristics of the period, is a true generalization of English life, a critical and objective assessment of it, and a reflection of the writer's attitude to the politics, science and culture of the time.

In turn, the Enlightenment movement has produced such great artists in England as Shakespeare, John Lily, Robert Green, and Thomas Nash, famous for their socio-political, philosophical and literary activities. While the English Enlightenment developed in the post-revolutionary period and took a compromise with it, the movement's supporters in France emerged at a time when the struggle of the social forces against the monopoly feudal order was intensifying and strengthened, with the ultimate goal of preparing a bourgeois revolution.

Dramaturgy plays an important role in the literary heritage of the great enlightener Shakespeare. During his short life, he managed to write 37 dramas and further enriched the treasury of world literature with his immortal works. He had a special love for theater and was engaged in drama writing for fifty-three years of his life. We have inherited such masterpieces as King Lear, Macbeth, Hamlet, Othello, Corliolan, Julius Caesar, Anthony and Cleopatra.

The idea of the great French thinker Victor Hugo Voltaire's great influence on the culture of the time: "He was more than a man" can also be applied to Shakespeare.

The role of Shakespeare’s work in the success of English drama in the Renaissance is fragmentary. One of the greatest playwrights in world literature, he was famous for his plays "King Lear Barber", "Hamlet" and "Othello". In these works, the author praised human intelligence, business acumen and dexterity. In turn, he ridiculed jealous, lowly, hypocrites like Yago. His dramas also condemned social inequality.

Shakespeare’s ideas had a strong influence on the social thinking and literature of many countries. He is one of those who were able to give a new spirit not only to the literature of the English Renaissance, but also to the classical word art of this people.

The influence of ancient culture on medieval literature is reflected in Shakespeare's King Lear, Macbeth, Hamlet, Timon of Athens, Anthony and Cleopatra, Julius Caesar, Richard III, Richard II, and Henry IV. , Henry V, and King John. In his dramas, positive heroes (Hamlet, Hortsio, Laert, Duncan, Banko, Macbeth, McDuff, and Lennox Sivard) are embodied as brave, courageous, healthy, generous, and always ready to help the oppressed, to sacrifice their lives for the motherland.

In Shakespeare's works, Eastern culture, science, and philosophy were combined with Western culture. The following words of the great literary critic Mikhail Bakhtin in his book "Aesthetics of Words" are noteworthy: Every cultural event lives within boundaries. When a culture is out of bounds, it loses its support, crumbles and dries up, becomes the same, and finally dies ”[1; 266].

The Renaissance paved the way for Enlightenment rhetoric [2; 379]. Let us consider the terminological meaning of this movement. The word "enlightenment" is used in a broad sense in the sense of making the people educated, enlightened, but in a narrow and clear sense it refers to the intellectual movement in the era of the rise of feudalism.

The importance of the main aesthetic views in the Enlightenment literature is explained by the fact that the educational features of art were directed to the reconstruction of society. The fact that the writers of the English Renaissance created political-philosophical novels, philosophical stories, and dramatic works of political-moral content in the spirit of enlightenment confirms our opinion.

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Representatives of this direction paid special attention to the description and analysis of the daily concerns and aspirations of the people. These qualities were vividly reflected in Shakespeare's work.

In all his works, Shakespeare promoted the doctrine of the detailed depiction of life in all its intensity and contradiction as the first basis of drama, defended the theoretical principles of realistic theater and drama. The artist also proved that real drama has a wider and more possibilities than the art of painting in depicting life events, human heart and emotions, actions, deeds, characters of people of different social classes. The fate of King Lear is family and children, state and personality.,a wide range of possibilities for continuous reflection on dozens of issues, such as practice and morality, lust and conscience. So is the immortality of a work of art.

It is noteworthy that Shakespeare was a proponent of the simplicity and authenticity of dramaturgy. He raised life issues that were relevant for his time. Feudal-nobility regimes protested the ruling environment. The tragic resolution in these works, written with high pathos, sounded like a sign of sharp protest against the environment of the time.

The pinnacle of Shakespeare's work is undoubtedly Hamlet. The idea of subjugating the powerful forces of nature and the universe to the will of man, studying its laws and serving these mysteries for the benefit of mankind is embodied in the image of Hamlet.

The tragedy shows the clash of two opposing forces: Claudius and Hamlet. One of them is the enlightened, educated; honest, conscientious Hamlet is a symbol of goodness. He struggles with himself first and foremost as a human being. Another powerful force, Claudius, embodied doubt, denial, and destruction.

Shakespeare skillfully instills in the nature and psyche of the protagonist that one of the most important phenomenal phenomena inherent in humanity is the need to think at the heart of everything. While the logic that "people need human morality based on human nature, experience, and understanding" [1; 7] defines Hamlet's worldview, Claudius is ready for any humiliation for glory and the throne.

Shakespeare's dramas focus on beauty, emotion, intuition, observation, and imagination, as opposed to the world of shadows ruled by ideas, to an interesting, full reality. excellent Because the beauty in art is the beauty that is born and re-created in the land of the soul, since the creation

of the soul is higher than nature and its phenomena, the beauty in art is equally superior to the natural beauty ”[4, 72].

In Shakespeare’s dramas, the focus is on beauty, emotion, intuition, observation, and imagination, and appeals to an interesting, full-fledged reality as opposed to the world of shadows ruled by ideas. [5; 72].

According to the Russian thinker Chernyshevsky, it was Belinsky's works such as "Articles on Folk Literature", "Literary Dreams", "The Ball of Wisdom", "Mentsel-Goethe Critic", "Poetry of Mikhail Lermontov", "Hamlet. Shakespeare's Drama ”series showed the real way in the emergence of national literature.

“You just have to write about what you know, what you know, and when you write, be sincere and honest; let the described situation burn the human heart, help to evaluate the reality, become a part of the reality experienced by the reader ”[6; 44]. Hence, Shakespeare’s dramas can answer all of this. Rare works created by the playwright play an important role in the development of literary and aesthetic views of the Renaissance artists, and these works depict life and death, joy and sorrow, happiness and tragedy side by side.

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PSYCHOLOGICAL CHARACTERISTICS OF INDIVIDUAL AND SOCIAL LEGAL CONSCIOUSNESS: STRUCTURAL AND CONTENT ASPECT

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ABSTRACT

The article examines the phenomena of individual sense of justice as an internal determinant of legally significant behavior - lawful or delinquent. A complex of its main components (properties), which are the most significant in the determination of the legal orientation of social behavior, is presented. Their substantive characteristics are stated, reflecting the opposite tendencies - law-abiding and illegal orientation of legal consciousness. The main spheres of legally significant behavior are noted, which cover the content of legal consciousness. Based on the structure of individual legal consciousness, the phenomenology of public legal consciousness is considered as an internal determinant of the rule of law in society and its opposite phenomenon - crime. Attention is paid to the reflection of public legal consciousness in the individual, which has a formative influence and in which one of the mechanisms of integration of individual psychological phenomena into social and psychological ones is manifested. Prospects for applied research of this problem are outlined.

KEYWORDS:*Individual Legal Consciousness, Public Legal Consciousness, Properties Of Legal Consciousness, Content Of Properties Of Legal Consciousness, Defects Of Legal Consciousness.*

INTRODUCTION

Ensuring law and order in society is traditionally considered as the fight against crime and other offenses, which in real practice is focused on identifying illegal acts and bringing the perpetrators to justice, and also includes a list of some measures to prevent offenses. The strategy of preventive activity is based on the principle of eliminating the causes and conditions of illegal acts, since crime is viewed as a secondary phenomenon in relation to other social phenomena that act as its determinants. One of the drawbacks of the study of crime factors, traditional for criminology, is to consider them as being side by side without differentiation in the socio-psychological mechanism of the legal behavior of people, without disclosing the influence of

each factor on the subject of behavior - first of all, on his inner world, which determines the nature of behavior. The disadvantage of the traditional “causal” approach to crime prevention is also related to its one-sidedness. This is expressed in the emphasis on the analysis of the factors of illegal behavior of people, which does not fully cover the factors of the opposite phenomenon - the rule of law. A systematic understanding of the social mechanism of the generation of crime can be achieved only by analyzing an integral phenomenon - the legally significant social behavior of members of society, both offending and lawful.

Based on the provisions of the principles of determinism and consistency, thefactors of law and order (crime) must be considered as a tiered system [see. more details 5] in which the causal determinants that directly affect the state of law and order (crime) are the phenomena that express the inner essence of the subjects of legally significant behavior. The rest of the determinants, which are various kinds of social conditions and influences, are secondary, external. They influence the formation and change of direct, internal determinants. In the theory of law and legal psychology, the concept is used to denote the inner essence of the subjects of legally significant behavior

"Sense of justice".It is applied both in relation to an individual, expressing an individual sense of justice, and in relation to a community of people or a certain social group - public sense of justice.

Characterizing individual legal consciousness in its most general form, it should be noted that it accumulates a set of psychological properties of the individual, manifested in the sphere of consciousness, which determine the legal orientation of the individual's behavior - law-abiding or illegal. Public legal awareness is the integration of the individual legal awareness of members of a community (social group) and at the same time, manifesting itself as a socio-psychological phenomenon, it influences the formation of individual legal awareness of members of society. This influence is due to the fact that a person, being in society, to one degree or another is guided by the opinion of the people around him, their attitude to certain actions, their reaction to these actions and the consequences associated with it. He builds his behavior, showing, on the one hand, independence (self-determination, the desire for personalization), and, on the other hand, conformism (the desire to ensure his own social adaptation and identification with the social environment).

Cognition and description of public legal consciousness, as an integrative education - a socio-psychological phenomenon, is based on the study of the individual legal consciousness of members of society and the systemic generalization of data. This generalization presupposes the establishment of prevailing trends in the qualitative characteristics of the legal consciousness of members of the community, the distribution of their types, as well as the establishment of socio-psychological influences on individual legal consciousness. Such influences are associated with the fact that people tend to assimilate the mentality prevailing in society and be guided by them. Thus, individual legal views are formed not only as a result of a personal assessment of the state of law and order, crime and other components of legal reality, but largely as a result of orientation towards the corresponding views of others. The individual develops ideas about the legal consciousness of other people, first of all, representatives of the social group to which he relates himself and on which he is guided. It assumes what opinion these people have on certain issues of legal reality, what positions they hold and have inclinations in terms of lawful and offensive behavior, what is their relationship to certain illegal acts, to lawful options for solving certain life problems, as well as to actions, aimed at fulfilling a civic duty to ensure law and order (for example, to report unlawful acts and persons committing them to law enforcement agencies, to give accusatory testimony, etc.). These views determine

The formation of individual legal orientations, positions, relationships, socio-legal expectations and personally acceptable ways of acting.Such a subjective picture of public legal consciousness is formed both as a result of the information flow, including communication with people around, and as a result of projection - ascribing to other people their own ideas, attitudes, personal norms of behavior and other properties of their own legal consciousness.

The qualitative characteristic of individual and social legal consciousness can be revealed structurally, which provides for the allocation of the components of an integral legal consciousness, as its properties and reflection of their substantive characteristics. In most scientific works, legal consciousness in its most general form is defined as his knowledge of legal norms, his attitude to these norms and his attitude to the need to comply with them. Individual legal consciousness reflects the legal worldview of a person and includes in its structure those psychological properties of an individual that relate to the phenomenology of consciousness, primarily to the cognitive sphere of the individual. Such properties are knowledge, perceptions, beliefs, expectations, evaluative standards, personal principles and norms, relationships.According to A.R. Ratinov and G.Kh. Efremova, the structure of legal consciousness includes four main types of relations: firstly, attitudes toward law (its principles, institutions and norms), secondly, evaluative attitudes toward the legal behavior of people, thirdly, toward law enforcement agencies and their activities, and, in -fourth, to one's own legal behavior (legal self-assessment) [8]. This point of view has its grounds, but it needs to be concretized. The structure of legal consciousness is determined by the structural-functional approach to understanding the psychological mechanism of legally significant behavior and the role of psychological properties of the individual in it. Thus, in the psychological mechanism of legally significant behavior (lawful or illegal), a mental reflection is manifested: legal norms; legally significant ways that the subject can use; objects to which legally significant behavior is directed; expected results of their actions; the social environment in which the subject acts; legal response measures; oneself as a subject of legally significant behavior.

A comprehensive analysis of the legal consciousness of an individual, the determination of the structure of its elements (properties) requires, on the one hand, the identification of properties that legitimately orientate behavior and provide anti-criminal stability of the individual. On the other hand, it is necessary to establish possible defects in legal consciousness, i.e. those of its properties that are internal prerequisites for illegal behavior. The disclosure of the legitimately orienting content characteristics of legal consciousness (its properties), as well as the characteristics of its criminogenic defects, can be carried out on the basis of an understanding of the criminogenic predisposition of the individual, the essence of which is expressed in the acceptability of certain criminal methods of action (selfish, violent, etc.) to satisfy needs or resolve problem situations. Law-abiding legal awareness consists in a negative attitude towards such methods, in rejection of their use, in resistance against the criminogenic influences of other persons and circumstances of the situation, as well as in the readiness to participate in strengthening the rule of law, including assisting law enforcement agencies in exposing criminals, fulfilling their civic duty.

Based on this approach, and based on the data of empirical research, as well as taking into account the work on this problem [1; 2; 3; 4; 6; 7; ten; 11], it is possible to highlight the main aspects of individual legal consciousness, which are its structural elements. These include the following.

1. Knowledge of legal regulations defining obligations, prohibitions, the procedure for the implementation of legitimate interests. Lack of sufficient legal knowledge is a prerequisite for offenses.

2. Relationship to legal regulations. It can be positive, negative, contradictory, and have different meaningful shades.

3. Attitudes towards legitimate ways to meet needs or resolve problem situations: work on a legal basis; to search for compromises in conflict; resorting to lawful means of protecting personal interests, etc.

1. Ideas about a law-abiding person and attitude towards him.

2. Attitude towards illegal ways of satisfying personal interests (selfish, violent, etc.).

3. Ideas about a person committing a wrongful act(of a certain nature) and attitude towards it

4. Attitude towards law-protected social values. This attitude can be respectful, humane or selfish, consumerist, dismissive, hostile. Respect for social values significantly determines the choice of legitimate and morally approved ways of interacting with them. The opposite attitude does not directly predetermine the subject's propensity for harmful actions, but is typical for persons committing illegal encroachments on them.

5. Ideas about the legal positions of other people. The subject of social behavior is characterized by an orientation toward other people, primarily those with whom he identifies himself, who for him represent a reference social group.

6. Social and legal expectations, express ideas about the consequences of illegal behavior and the success of legitimate ways to satisfy interests. These expectations relate, on the one hand, to the onset of legal responsibility for committing illegal actions (its inevitability or the ability to avoid), on the other hand, the success of legitimate ways to satisfy certain interests.

7. Attitude towards illegal behavior of other people. In this respect, on the one hand, one's own attitude towards illegal acts is projectively manifested. On the other hand, this attitude acts as the basis of an individual position in fulfilling a civic duty of participation in maintaining law and order.

8. Attitude to law enforcement activities of state bodies, which expresses attitude to legal control of law enforcement agencies, to their detection of illegal acts and the persons committing them, to the application of legal sanctions and measures of legal responsibility, as well as the attitude towards law enforcement officials.

9. Attitude towards the fulfillment of the civic duty of participation in the maintenance of law and order, namely: participation in the protection of law-protected social values, in the suppression of illegal acts, in the exposure of criminals and in justice over them. This attitude is concretized as an attitude towards various forms of participation in the maintenance of law and order, which are a legally established obligation (for example, participation in a criminal process as a witness), or act as a moral civic duty (for example, to prevent illegal actions, report to law enforcement agencies), or organized by state bodies and public institutions (for example, participation in preventive measures or in the protection of public law and order together with employees of the internal affairs bodies).

10. Attitude towards the criminogenic influences of other persons who incline to commit illegal acts. The most important component of legal consciousness is a critical attitude towards such influences, an awareness of one's own responsibility for one's actions, the need for legal self-determination.

Among the elements (properties) of legal consciousness, there are the most significant in the determination of the legal orientation of behavior, which express the most significant differences in the legal consciousness of law-abiding persons and offenders. An empirical study of the

peculiarities of the legal consciousness of juvenile offenders showed that the most significant differences in their legal consciousness are manifested:

1) in ideas: about the positive aspects of illegal methods of action, their commonness in the reference community and in an approving and justifying attitude towards them; about the positive qualities of the subjects of the illegal act and the justifying or sympathetic attitude towards them; about the limited possibilities of legitimate ways to solve certain problems and in an indifferent or skeptical attitude towards them; about such personal qualities and position of a law-abiding person, which determine a sympathetic or indifferently alienated attitude towards him; about the low social and personal significance of the negative consequences of unlawful acts, including responsibility for unlawful behavior; about the predominantly negative qualities of law enforcement officials;

2) in the peculiarities of social and legal expectations: in the confidence in the possibility of avoiding responsibility when committing a wrongful act; in the opinion that a significant part of the perpetrators of crimes avoid responsibility, combined with a positive attitude towards this phenomenon; in superficial ideas about the consequences of criminal punishment, in this connection, it is not recognized as a factor that hinders the achievement of well-being in life;

3) in the peculiarities of personal norms (principles) concerning legally significant behavior: in the justification and admissibility of the use of illegal actions under circumstances that are subjectively assessed as compelling; in the absence of a fundamental personal intention (prohibition) not to commit illegal acts, regardless of their nature.

Legal consciousness covers the main areas of legally significant human behavior, as well as his social roles, the implementation of which is regulated by law and provides for certain obligations and prohibitions. The main spheres of legal awareness are:

1) the sphere of ensuring material interests - in relation to it, the rights, legal methods of ensuring material interests and the procedure for their implementation are determined, as well as administrative and criminal prohibitions are established, which are qualified as mercenary crimes;

2) the sphere of interaction with other people and other social subjects, including with state bodies - in this area, the rights and obligations of a capable person are established, as well as administratively and criminally punishable acts that are expressed in violent and other harmful actions against social subjects;

3) the sphere of consumption and leisure (satisfaction of needs for rest, entertainment, etc.) - for this sphere, illegal actions are defined that bring physical or moral harm to the subject himself, other people, public morality and other social values.

In these areas, a person performs various social roles, the implementation of which is also regulated by law. Thus, for persons with children, obligations are established to provide material support for minor children, to participate in their upbringing, and to take care of their health. A number of civil obligations have been established, the failure of which entails criminal liability, for example, for evading military service, evading testimony, failure to provide assistance to the victim in certain cases, etc.

In the sense of justice, one can distinguish the ideal level and the pragmatic level. In the individual legal consciousness, the ideal level is a set of value-normative ideals of the individual, which are based on opinions and attitudes concerning legally significant behavior. They determine what actions and ways of solving life problems are correct, proper, fair, respectable, as well as what are reprehensible, unfair, unworthy. These value-normative ideals are desirable for people, but not always real regulators of behavior. In terms of their regulatory function, they are

comparable, for example, with the ideal self-image, which is desirable for an individual, but not always obligatory. An individual in his actions seeks to meet ideal ideas about what he needs to be and how to act, but this desire does not always act as the dominant internal factor in motivation and decision-making to perform certain actions, since motivation and goal-setting are also influenced by other factors, such as internal and external. Based on the value-normative ideals, a person evaluates the actions of other people and his own, feels a sense of pride in him when his actions correspond to personal ideals or remorse in the opposite case.

Being in specific social conditions, he is forced to adapt to them to one degree or another and focus on the possibilities that really exist, on the social impact that is exerted on him. In accordance with this adaptation, a pragmatic level of legal awareness is formed, the basis of which is formed by subjectively permissible variants of legally significant behavior and ways of satisfying needs. They can be perceived by an individual or the majority of representatives of a social group as unworthy, but forced and justified in the given conditions due to the lack of real opportunities to satisfy needs and interests in a legal way in accordance with value-normative ideals.

As an integrative content characteristic of individual legal consciousness, it is advisable to consider its orientation, which can be represented in the continuum: lawful - illegal. The legitimate orientation of legal consciousness expresses the resulting personal predisposition to compliance with legal regulations and volitional resistance against the commission of illegal acts, including resistance to criminogenic circumstances and influences. Illegal orientation is associated with the presence of defects that act as personal prerequisites for illegal behavior. However, if the lawful orientation can characterize the legal consciousness of the individual as a whole, then the illegal one can manifest itself both in certain areas of legally significant behavior (in relation to certain law-protected values and types of illegal acts), and be relatively "global" in nature, presenting the internal possibility of committing illegal acts different kinds against different social values.

The characterization of public legal consciousness presupposes the identification of trends in the statistical distribution of various content types of the above-mentioned main components. When studying public legal consciousness, it is necessary to focus on its identification in those social groups that represent the part of the population that is most active in legally significant behavior and is significant in the formation of the level of law and order, which is characterized by the opposite phenomenon - the level of crime. Of particular importance in the study of public legal consciousness is the knowledge of its content dynamics - trends in changes in its main components. They internally determine tendencies in the legally significant behavior of members of society, i.e. tendencies of changes in the structure and level of crime, and, consequently, changes in the indicators of law and order.

Summing up, it should be noted that the presented structure of the properties of a person's legal consciousness with their meaningful characteristics serves as a theoretical and methodological basis for practical research of individual legal consciousness in order to predict the social and legal behavior of an individual. On the basis of such an assessment of legal consciousness, it is possible to purposefully carry out preventive and corrective work in relation to a person, forming the necessary content of his properties. The refraction of these provisions on individual legal consciousness on the understanding of public legal consciousness provides the basis for applied

research focused on assessing the state and trends of changes in the internal (socio-psychological) prerequisites of the rule of law and crime. Such a study can reflect the most basic characteristics of public legal consciousness, including its defects, which will make it possible to determine measures aimed at changing them.

A specific study of the legal consciousness of an individual (as well as public legal consciousness) is determined by the concretization of the sphere of social and legal behavior, in relation to which it is necessary to give a qualitative assessment of the content of legal consciousness and, on this basis, the predisposition in the behavior of the individual. Of particular importance in such a practically oriented assessment of individual legal consciousness is the formulation of generalizing conclusions. Justification of the parameters and criteria for such conclusions is one of the scientific tasks. The most important direction of applied research on the problem of the legal consciousness of the individual and public legal consciousness is also the development of diagnostic techniques.

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A REVIEW OF POPULAR DECISION TREE ALGORITHMS IN DATA MINING

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ABSTRACT

Data gathering and production technologies have progressed quickly. As a consequence, everything becomes automated, including data storage and accumulation. Data mining is a technique for predicting previously unseen valuable information from massive amounts of data. Otherwise, we have a lot of data but little information, which may be wrong. This paper presents an overview of data mining methods, with an emphasis on the prominent decision tree algorithms (C4.5 and ID3) and associated learning tools. The accuracy has been shown using a variety of datasets.

KEYWORDS:*C4.5, Classification, Data Mining, Decision Tree, ID3.*

7. INTRODUCTION

Various companies face problems and losses on a daily basis as a result of the enormous amounts of data they collect. This is owing to a lack of enthusiasm for techniques for extracting meaningful patterns from these datasets. We need Knowledge Discoveryin Databases(KDD)to increase income and decrease losses. KDD is a method for analyzing data from different angles and gaining information[1]. Selection, transformation, interpretation/evaluation, processing, and data mining are all stages in the KDD process. Data mining is a subset of KDD, and its goal is to find useful information in massive databases[2]. As a result, data mining has piqued the attention of many academics. As indicated in Table 1, the growth of data mining is a result of the increasing usage of computerized databases to store data and give multi-level responses to businesspeople.

TABLE 1: DATA MINING EVOLUTION

Evolutionary	Question	Technology
Data Collection	What was the revenue in six months ago?	computers, tapes, disks
Data Access	What were item sales in India Jun.ago?	faster and cheaper computers with more storage, relational databases
Data Warehousing	What were item sales in India Jun.ago? Drill down to Delhi	faster and cheaper computers with more storage, On-line analytical processing multidimensional databases, data warehouses
Data Mining	What's likely to happen to Delhi item sales next month? Why?	faster and cheaper computers with more storage, advanced computer algorithms

7.1. Data Mining Techniques:

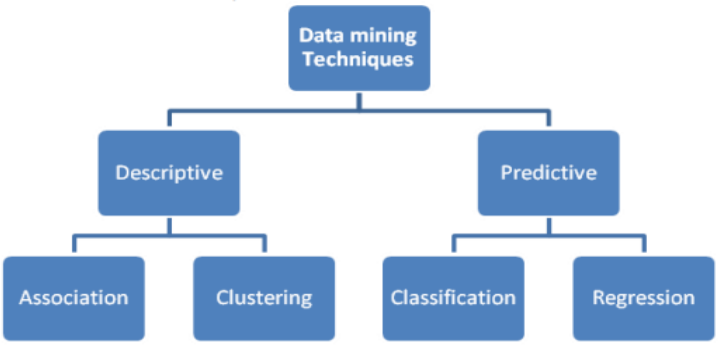


Fig. 1: Data mining techniques[3]**.**

These strategies differ depending on the needs of mining methods. There are a plethora of effective methods for data mining and retrieval. As illustrated in Fig. 1, these methods include Association, Clustering, Regression, and Classification.

7.1.1. Association:

It allows for the discovery of hidden connections between disparate variables in databases[4]. It reveals confusing patterns in the data and uses various measures of significance to pick the best rules from other rules. Lowest support and confidence levels are the best indicators.

7.1.2. Clustering:

It is the process of finding data sets that are comparable to one another in order to comprehend the differences and similarities between them[5]. It is based on distance measurements. As a partitioning method, there are two types of clustering algorithms: locality-based and grid-based.

7.1.3. Regression:

It's a method of analyzing data to determine the relationships between variables[6]. It depended on providing values to get new values. It utilizes linear regression for simple instances, while relative decline is used for complicated cases that are difficult to forecast because they rely on complex interactions of many factors.

7.1.4. Classification*:*

It refers to the categorization of data to make it easier to use and more efficient[7]. It attempts to speed up data collection and retrieval, as well as anticipate a certain impact based on available data. For example, the incoming messages to the e-mail account may be split into dates.

8. DISCUSSION

8.1. Predictive Analysis:

Predictive analysis is a kind of data analysis that involves determining unknown values for a prediction target characteristic[8]. It comprises a classification task for predicting class labels and a numerical prediction job for predicting continuous or ordered values. Learning model and prediction are two of the most important functions of prediction. The target attribute's type

determines whether the issue is binary classification or numerical prediction with continuous values. To obtain the outputs, classification refers to predicting a particular effect based on a specific input. The algorithm tries to find a relationship between the characteristics that would allow it to be reasonable to get the results. The categorization job is shown in Fig. 2.

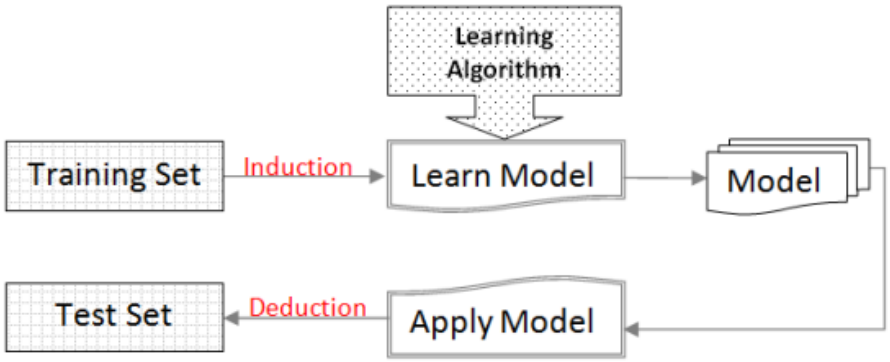


Fig. 2: Classification task steps[7].

It wraps together the functions for obtaining classes or principles for obtaining the class of objects whose class has been revealed. The examination of the training set is used to determine the steps. We utilize test data to determine the correctness of the final, optimized, and technique. The goodness of classification learning is calculated using this data set. Data mining classification techniques include decision trees, rule-based classification, back propagation, lazy learners, and others. In data mining classification, a decision tree is an essential classification method. It wraps together the functions for obtaining classes or principles for obtaining the class of objects whose class has been revealed. The examination of the training set is used to determine the steps. We utilize test data to determine the correctness of the final, optimized, and technique. The goodness of classification learning is calculated using this data set. Classification techniques used in data mining include decision trees, rule-based, back propagation, lazy learners, and others. In data mining classification, a decision tree is an essential classification method.

8.1.1. Decision Tree:

Depending on the quantity of data, the effectiveness of the method, and the amount of memory available, the Decision Tree classification technique may be performed in serial or parallel stages[9]. A serial tree is a logical model in the form of a binary tree built from training data. Using predictor variables, it aids in forecasting the value of a target variable. It is made up of sets of rules that are arranged in a hierarchical order. It's a simple recursive structure for expressing a decision process in which a future instance is categorized into current preset classes and observations are divided into mutually exclusive subgroups. Each branch of the tree represents one or more records from the original data collection. The root node (no inbound connection) is at the top of the tree and represents all of the rows in the dataset. The internal or decision nodes (with just one incoming connection) are used to test on an attribute. As illustrated in Fig. 3, the downmost nodes are called terminal nodes (no outgoing connection) and indicate a decision class.

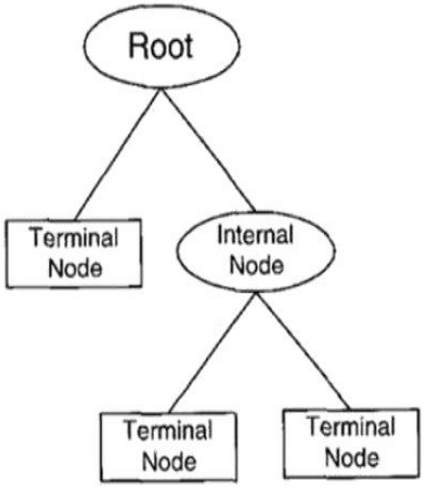


Fig. 3: The form of decision tree.

Each node produces child nodes until the subgroups are too tiny to divide meaningfully or there are no statistically significant subgroups left after further splitting. Some parts of the sample may result in a large tree, and some connections may result in outliers or erroneous results. Branches like this must be cut off. Tree pruning should be done in a way that does not have a major impact on the model's accuracy rate. We will leave the pruning to future research in our paper. Decision trees simplify the representation of data and the extraction of IF-THEN categorization rules.

8.2. ID3 Algorithm:

J. Ross Quinlan created ID3, a basic decision learning systemthat builds decision trees by testing each characteristic at each node using a top-down, greedy search over the supplied sets of training data[10]. It chooses which characteristic to test at each node in the tree based on a statistical feature called information gain. The amount of information gained by a particular characteristic determines how effectively the training examples are classified according to their goal categorization.

Let's utilize the ID3 method to see whether the timing is right for a game of baseball. The data is aggregated over the course of two weeks to aid in the construction of the ID3 decision tree shown below. The question is "Do you want to play ball?" and the answer is Yes or No.

TABLE 2: WEATHER DATA SETS

Outlook	Temp	Humidity	Windy	Play Golf
Rain	Hot	High	false	No
Rain	Hot	High	true	No
overcast	Hot	High	false	Yes
Sunny	Mild	High	false	Yes
Sunny	Cool	normal	false	Yes
Sunny	Cool	normal	true	No
overcast	Cool	normal	true	Yes
Rain	Mild	High	false	No
Rain	Cool	normal	false	Yes
Sunny	Mild	normal	false	Yes
Rain	Mild	normal	true	Yes
overcast	Mild	High	true	Yes
overcast	Hot	normal	false	Yes
Sunny	Mild	High	true	NO

We need to compute two kinds of entropy using frequency tables in order to build a decision tree:

8.2.1. Step 1: Calculate Entropy of Play Golf (Target):

Play Golf	
Yes	No
9	5

$$\text{Entropy(Play Golf)} = \text{Entropy}(5,9) = -(0.36 \log_2 0.36) - (0.64 \log_2 0.64) = 0.94$$

8.2.2. Step 2: Split Dataset into Different Attributes:

For each way, the entropy is calculated. The difference between the resultant entropy and the entropy before the split is used to compute the final entropy for the split. The Information Gain is the outcome.

		Play Golf	
		Yes	No
Outlook	Sunny	3	2
	Overcast	4	0
	Rainy	2	3
Gain=0.247			

		Play Golf	
		Yes	No
Temp.	Hot	2	2
	Mild	4	2
	Cool	3	1
Gain=0.029			

		Play Golf	
		Yes	No
Humidity	High	3	2
	Normal	4	0
Gain=0.152			

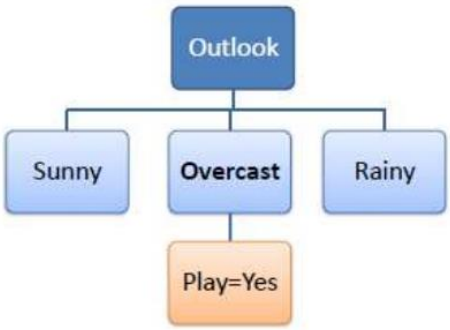
		Play Golf	
		Yes	No
Windy	False	3	2
	True	4	0
Gain=0.048			

8.2.3. Step 3: Pick Out Attribute With The Greatest Information Gain:

		Play Golf	
		Yes	No
Outlook	Sunny	3	2
	Overcast	4	0
	Rainy	2	3
Gain=0.247			

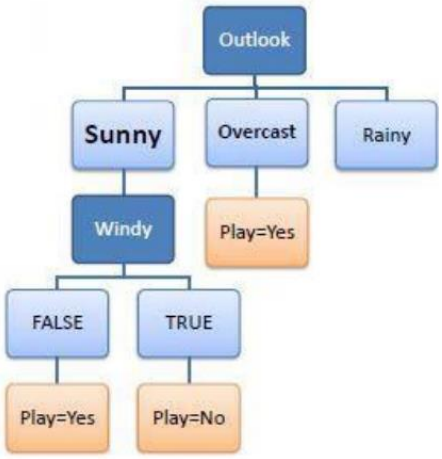
8.2.4. Step 4a: A Branch with the Entropy of Outlook= Overcast:

Temp	Humidity	Windy	Play Golf
hot	high	False	Yes
cool	normal	True	Yes
mild	high	True	Yes
hot	normal	False	Yes



8.2.5. Step 4b: A Branch with Entropy of Outlook= Sunny:

Temp	Humidity	Windy	Play Golf
mild	high	False	Yes
cool	normal	False	Yes
mild	normal	False	Yes
mild	high	True	NO
cool	normal	True	No



8.2.6. Step 5: Recursively Turned ID3 Algorithm on the Non-leaf Branches:

R1: IF (Outlook=Sunny) AND (Windy=FALSE) THEN Play=Yes
R2: IF (Outlook=Sunny) AND (Windy=TRUE) THEN Play=No
R3: IF (Outlook=Overcast) THEN Play=Yes
R4: IF (Outlook=Rainy) AND (Humidity=High) THEN Play=No
Rs: IF (Outlook=Rain) AND (Humidity=Normal) THEN Play=Yes

8.3. C4.5 Algorithm:

Ross Quinlan created the C4.5 algorithm, which is used to build a decision tree[11]. Quinlan's previous ID3 method is expanded in C4.5. C4.5 generates decision trees that may be used for classification, which is why it's frequently referred to as a statistical classifier.It was created to better handle noisy data, missing data, decision tree pre- and post-pruning, attributes with continuous values, and rule derivation.C4.5, like ID3, constructs decision trees from a set of training data, utilizing the concepts of information gain and entropy in addition to the gain ratio. The gain ratio, as we discussed previously, favors characteristics with a high number of values. If each record has a unique value for property D, then entropy (D, T) is 0 and information gain (D, T) is maximum. Quinlan proposes adopting the following ratio instead of information gain to compensate for this:

$$\text{GainRatio}(D,T) = \frac{\text{Gain}(D,T)}{\text{SplitInfo}(D,T)}$$

As a result, the gin ratio is a modification of the information gain that lowers its bias on high branch characteristics. Split Info (D, T) is information resulting from the splitting of T based on the value of the category characteristic D as follows:

$$\text{Split Info}(D,T) = -\sum_{i=1}^{K} \frac{D_i}{T} \log_2 \frac{D_i}{T}$$

8.4. Decision Tree Learning Tools And Datasets:

There is a lot of software available for data mining. We will show the experimental findings of the dataset with 10-fold cross validation using the WEKA tool. To evaluate the accuracy of ID3 and C4.5 classifiers, datasets were obtained from UCI or KEEL libraries.

WEKA is a machine learning tool that may be used to support a variety of data mining techniques. The application is written in Java and includes a graphical user interface for dealing with data files and generating visual results. The features of chosen datasets with nominal attributes and no missing values are shown in the Table 3below.

TABLE 3: DATASETS CHARACTERISTICS

Data Set	No.of Attributes	No.of Classes	No.of Instances	ID3	C4.5
car	7	4	1728	89.3519 %	94.1551 %
connect-4	43	3	67557	74.1507 %	80.1901 %
monks	7	2	124	79.0323 %	80.6452 %
nursery	9	5	11025	97.9955 %	98.6032 %
promoter	58	2	106	76.4151 %	81.1321 %
tic-tac-toe	10	2	958	83.2985 %	86.4301 %
voting	17	2	435	94.2529 %	94.4828 %
zoo	17	7	101	92.0198 %	98.0792 %
kr-vs-kp	37	2	3196	99.4871 %	99.6055 %

The accuracy of each dataset while using the ID3 and C4.5 methods is shown in Fig. 4.

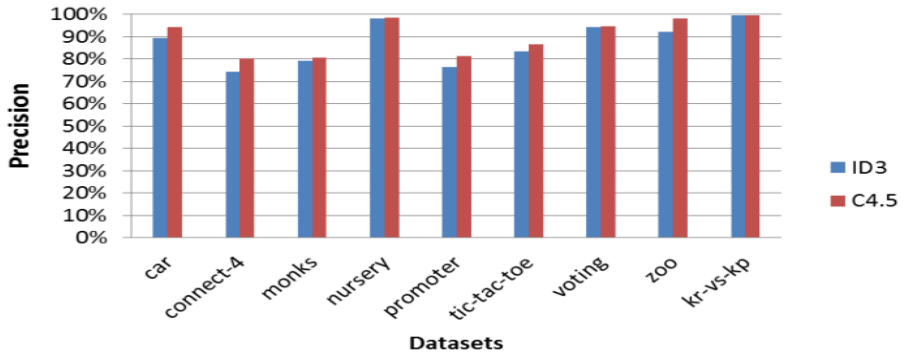


Fig. 4: The precision of ID3 & C4.5.

Other characteristics of datasets with both continuous and discrete variables with missing values may be handled. By utilizing unsupervised discretization to transform continuous characteristics into categorical attributes and pre-processing to replace the empty cells, the ID3 algorithm is unable to handle these features.

9. CONCLUSION

Data mining is a set of algorithms used by offices, governments, and businesses to forecast and create patterns with particular goals in mind. We have provided an overview of data mining development, methods, and predictive analysis in this paper, with an emphasis on C4.5 and ID3 decision trees, as well as a comparison between them when applied to various types of data with varying values. Finally, the C4.5 method is similar to the ID3 algorithm in that it uses uncertain or missing data, accepts various weights for attributes, and builds the tree before pruning it (pessimistic prediction).

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ANTIMICROBIAL ACTIVITY OF VARIOUS HERBAL PLANTS EXTRACTS: A REVIEW

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ABSTRACT

In this article, we look at how traditional plants are utilized throughout the globe to cure infectious illnesses caused by bacteria. Antibiotics were discovered in the early twentieth century and provided a tool against microbial infections, and even though due to multiple drug resistance and adverse effects on the host, such as hypersensitivity, immune suppression, and allergic reactions, there is a need for natural medicines with a safer and more effective therapeutic effect. Secondary metabolites found in medicinal plants of natural origin, such as alkaloids, steroids, tannins, and phenolic compounds, may exhibit antibacterial action via a variety of methods. These active constituents exert their therapeutic action by destroying the microbe's cell membrane, membrane proteins, and enzymes situated on the cell membrane, among other things. Root extract of herbal medicines with low inhibitory concentrations against microbial illnesses address the demand for a safe and effective anti-infectious drug.

KEYWORDS:*Antimicrobial Activity, Minimum Inhibitory Concentration, Secondary Metabolites, Extract.*

INTRODUCTION

More than 80percent of the surveyed of the world's population, according with World Health Organization (WHO), rely on traditional medicine for their basic healthcare requirements. Plants have long been used as a source of medicine, and they have played an essential part in health services all throughout the world. Herbal medicine has relatively long history interactions with the environment all throughout the globe. Traditional medicine plants include a variety of chemicals that may be utilized to treat both chronic and infectious illnesses. Diseases may be

caused by microorganisms. Viral, bacterial, and fungal infections are all extremely common in the human body[1]. Antibacterial were discovered in the early twentieth century and became an increasingly significant weapon in the fight against bacterial infections. However, multiple drug resistance has evolved as a result of the indiscriminate use of commercial antimicrobial medicines widely employed in the treatment of infectious illnesses.

In addition to this issue, antibiotics have been linked to host side effects such as hypersensitivity, immunological suppression, and allergic responses[2]. This necessitates the development of novel antimicrobial treatment drugs that are both effective and safe. In this respect, naturally occurring medicinal plants with active components that have antibacterial action may offer a large study field. Plant-derived antimicrobials have tremendous therapeutic promise. They are efficient in the treatment of infectious illnesses while also avoiding many of the adverse effects that synthetic antimicrobials are known for. Plant materials' positive therapeutic effects are usually due to a mix of secondary compounds found in the plant. Secondary metabolites in plants, such as alkaloids, steroids, tannins, and phenol compounds, flavonoids, steroids, resins, fatty acids gums, and flavonoids, steroids, resins, fatty acids gums, are capable of generating specific physiological effect on the organism[3].

Active Components of Medicinal Plants Have Different Mechanisms Of Action

Various bioactive controlling the operation includes cytoplasmic membrane disintegration, proton motive force instability, electron movement, active transport, and cell content coagulation. Natural oils feature hydrophobic components that enable lipids from the bacterial cell membrane to participate in antimicrobial activity, disrupting cell structures and making them more permeable. Essential oils include chemical components that interact with cytoplasmic membrane proteins. ATPase enzymes are known to be found in bacteria's cytoplasmic membrane, surrounded by lipid molecules. Cyclic hydrocarbons bind to these enzymes and act on them. Furthermore, lipid hydrocarbons may alter the lipid-protein interaction, and lipophilic substances may bind directly with hydrophobic regions of the protein. Some essential oils promote pseudo-mycelia development, indicating that they may effect on enzymes engaged in the making of bacterial structural components[4].

Plant Dyes as Antimicrobial

Despite the many advantages of natural dyes and antimicrobials, there are certain disadvantages that limit their use. Some key advantages and limitations of natural dyes/antimicrobials applications are described in the following paragraphs[5].Plant products make up the largest portion of all natural antibacterial agents. Some plant products have been utilized for healing purposes since ancient times. Plants can produce a nearly infinite number of aromatic compounds, the majority of which are phenols or their oxygen-substituted derivatives. The majority of them are secondary metabolites, with at least 12,000 having been identified. These substances are often used by plants to protect themselves against microbes, insects, and herbivores. Plant smells are caused by certain chemicals, such as terpenoids, whereas plant pigments are caused by others. Plant flavor is caused by a variety of chemicals[6].

Extraction Techniques

The most essential stage in achieving the required dyeing characteristics and/or antimicrobial activity on textiles is to extract dyes/antimicrobials from natural sources. Obtaining a standard extraction method and optimizing the relevant factors for a certain natural source are also economically significant and have an impact on product prices[7]. The next paragraphs will describe the various ways of extracting these minerals from natural resources:

• Aqueous Extraction

The chemical nature of the majority of natural dyes/antimicrobials enables for the use of the most commonly utilized and simple-to-set-up aqueous extraction method. Typically, dried and finely cut natural resource material is crushed into powder, and the dye/antimicrobial is extracted in water using several conventional methods. To make a crude extract, the aqueous solution may be filtered and concentrated under decreased pressure (rotary evaporator). The choice of solvent is critical in the natural dye extraction procedure. Different solvents were used in order to improve the natural dye extraction yield from Gardenia jasminoides Ellis, which included crocin as the primary colorant, in a recent study. Fifteen different solvents were tested, and those that produced colors that were similar to the goal color were combined with water in various ratios to determine the condition that would produce the color that was closest to the target color. To produce dyes with high absorbance and as near to the desired color as feasible, four solvents (methanol, ethanol, 1-propanol, 2-propanol) with Hansen solubility characteristics comparable to crocin and low chi parameter values were selected. The four solvents were then combined in different volume ratios with distilled water[8].

• Extraction Using an Alcoholic or Organic Solvent

Some organic dyes/antimicrobials are extracted from natural resources using non-aqueous extraction techniques. Natural colors are extracted using a combination of organic solvents, typically alcohols and hexane, in this technique. The roots of the genuine Ratanjot sample, for example, were air-dried and crushed to a coarse powder. The powdered roots were extracted in a soxhlet device with n-hexane until the decoction's color became extremely light. The solvent was extracted from the roots, and the yield percentage of the hexane extraction was determined.

• Extraction Using Ultrasonic Waves

The frequency of ultrasonic waves increases the extraction yield in this technique. During a known mechanism known as "cavitations in liquid media," which includes the growth and explosive collapse of microscopic bubbles producing localized high temperature and pressure, shock wave, and shear force breaking chemical bonds, ultrasound improves the efficiency of various chemical and physical processes. Several efforts have been made to investigate and utilize this technique for colorant extraction and application. The main influential factors on the process efficiency are the extraction bath pH, salt concentration, ultrasonic power, extraction time, and temperature. Enzyme aided extraction is a cutting-edge extraction technique that is extensively utilized nowadays owing to its great efficiency when compared to traditional approaches. The enzyme-treated material was rinsed with distilled water before the pH of the solution was adjusted. At the appropriate temperature, the sample was shaken at 150 rpm for 20-80 minutes. To eliminate solid contaminants, the contents of beakers were filtered through a conventional test sieve, and the concentrated dye extract was vacuum evaporated in a rotary vacuum evaporator to approximately half of its original volume, before being spray-dried.

• Extraction Aided By Microwave

Microwave heating (volumetric heating) is much faster than traditional surface heating. Microwave aided extraction is claimed to reduce extraction time and energy input to a large extent. Various academics have lately focused their attention on using microwave radiation as a contemporary technique for extracting natural minerals. This is due to the process's cleaner nature, reduced energy usage, and greater yield when compared to traditional extraction techniques. Dabiri et al. improved the microwave aided extraction (MAE) technique of two common dyes from Rubiaceae plants, alizarin and purpurin, and compared its effectiveness to ultrasonic and reflux extraction methods. The greater quantity of crude material recovered (varying from 84 to 94 percent), shorter extraction time (20 min vs. 6 h), and lower solvent

consumption all contributed to MAE's superiority (20 vs. 100 ml). Natural color extraction from pomegranate peel and Annatto is another example of the MAE method. Influencing factors such as extraction time, solution pH, and crude material weight have been simulated, optimized, and compared to those used in traditional methods. Improved dye yield and a significant reduction in extraction time were used to show MAE's superiority over the traditional aqueous extraction technique. It was also shown that under microwave irradiation, the dye ability of acrylic fibres may be substantially enhanced as a consequence of increased dye adsorption into fibres owing to local overheating and amplified reaction likelihood between the dye and fibres.

Processing Of Fabric with Different Extracts

a) Aloe Vera(ALOE BARBADENSIS MILL)

The Aloe Vera plant, which belongs to the Liloaceae family, is known as the "desert lily." For almost 2000 years, Aloe Vera is being used as a skin product. Scientific study has also shown that Aloe leaf contains approximately 75 nutrients and 200 active chemicals, including 20 minerals, 18 AA, and 12 vitamins, according to current research.Aloe Vera contains a variety of polysaccharides, including glucomannan of various molecular weights, acetylated glucomannan, gaalactogalacturan, glucogalactogannan of various compositions, and acetylated mannan or acemannan. Pad-dry-cure method was used to impart antimicrobial finishing on cotton woven fabric using Aloe Vera extract at different concentrations in the presence of eco-friendly cross-linking agent glyoxalin.

b) **Papaya Seed**

The papaya seed and leaves were gathered and properly cleaned. It was dried for 15 days and ground to powder using a mixer. 5 grams of powder were combined in 100 milliliters of distilled water, while 70 percent methanol was used for the solvent extract. At 4 degrees Celsius, the solvent extract was maintained in a water bath for one hour. The filtrate was collected after the extract was filtered using filter paper to decrease the volume to 10%. The lack of an OH group at ortho position, which is responsible for binding the extract to the fabric, prevented it from being applied to the substrate.

c) **Neem (AZADIRACHTAINDICA)**

In Ayurveda, Unani, and homeopathic medicine, neem is extensively utilized. For its many uses, neem has been found to have over 140 bioactive components. Mahesh et al used neem extract on cotton fabric to conduct a comparison study of the dip-dry and exhaust methods. According to reports, the exhaust technique is superior to the dip-dry method. Joshi investigated the effectiveness of neem seed and bark extracts against Bacillus subtilis on cotton and cotton/polyester mix fabrics. The impact of neem extract on diapers was compared to that of several synthetic antibacterial agents by, who found that natural agents' activity was comparable to that of synthetic agents. The Neem powder was used to make a methanolic extract, which was kept for 48 hours. The methanol was then evaporated using a rotary evaporated method. Using the dip padding method, the extract was applied to the cloth.

d) **Banana (Leaf and Peel)**

100g banana peels were chopped into tiny pieces and cooked in 1L of 0.1 percent NaOH solution. The extract was obtained after filtering the solution using filter paper. The dyeing bath was heated to 800°C for 90 minutes while continuously swirling the banana peel extraction. The textiles were washed with water after dying and air-dried.

e) **Mango**

The leaves were gathered and carefully cleaned in water. It was dried in the sunshine before being crushed into a fine powder using a grinding machine. The extraction was place at 980C for

60 minutes using the aqueous extraction technique. To get a clear solution, the extract was filtered three times using filter paper. In the water bath, dyeing was done at 800C for 60 minutes at MLR 1:50. The coloured cloth was dried for two minutes at 800°C.

f) **Pomegranate (PUNICAGRANATUM)**

Vitamins A, D, B, and calcium are abundant in pomegranates. It contains 1.2 g of total fat and is extensively utilized in Ayurvedic treatment. Gupta29 investigated the antimicrobial properties of pomegranates and their impact on cloth. The fabric's stiffness and tensile strength increased, as did its longevity, which may be enhanced further by micro encapsulation or the use of a cross linking agent. The antibacterial activity of pomegranate on cotton fabric was tested using the dip technique and then the exhaust method, with the exhaust approach being effective against both Gram positive and negative bacteria, but more effective against Gram negative bacteria 24. Sathianarayanan22 utilized three techniques (direct, micro encapsulation, and cross linking), and wash durability showed found to be better on the cloth coated with micro encapsulation and a silane coupling agent.

Early Application of Natural Dyes/Antimicrobials On Textiles

Colorants are derived from many sections of plants, including the bark, leaf, root, seed, and flower, and include common colour structures like tannin, flavonoids, quinonoids, and others. The examples of early uses of these extracts are categorized in the following sections according to the various portions of plants utilized as natural resources.

A.Root Dyes and Antimicrobials

The root is one of the most frequent components of the plant that has been used to extract colours and antimicrobials. Gupta, et al., investigated the dyeing of nylon using an extract of madder, the ground root of the Rubia species with an anthraquinone substituted chemical structure, as an example of application. Purpurin was isolated from madder and used to color nylon fibers. It has a structure of 1, 2, 4- trihydroxyanthraquinone. The isolated red pigment has a high affinity for nylon fibers, according to the scientists. In a similar study, the light fastness of madder extracts applied on nylon was also investigated[9]. Purpurin and munjistin, two pigments derived from Indian madder by soaking and extracting with alum, were used to dye nylon using ferrous sulfate, copper sulphate, alum, and stannous chloride as mordants. The textiles had excellent light fastness, but the dye fastness of the fabrics colored with munjistin was poor, according to the authors. Montazer and Parvinzadeh also colored wool yarns using madder and aluminum potassium sulfate as a mordant, and then treated them with various ammonia solutions. During wash fastness testing, the dyed samples changed color, while light fastness tests revealed that the madder-dyed yarns faded more following ammonia treatment. Ammonia's impact on the coloristic characteristics of wool dyed with madder and other natural dyes containing anthraquinone, naphthaquinone, flavone, and tannin structures was also studied. Madder, cochineal, walnut husks, weld, red and white onion skins, and pomegranate shells were used to dye aluminum-mordanted wool, with the color variations attributed to the expansion of the dye molecule conjugated system by one lone pair electron in ammonia solution.

B. Seed Dyes and Antimicrobials

Plant seed may be a significant source of natural colors and antimicrobuals. Bixin, a natural dye found in annatto seed containing carboxylate groups, may be called a natural acid dye. The amino groups in protein fibers are protonated when pH decreases, and the ionic interaction of bixin carboxylate anions with amino cations increases, resulting in increased affinity and dye absorption. The color imparting ability of mordants for both wool and silk fibers was found to be in descending order with bixin dye: ferrous sulfate>aluminumsulfate> magnesium sulfate> no salt, which was attributed to the ease and speed with which iron and aluminum formed salts with

bixin when compared to magnesium. Using bioactive compounds derived from ban-ajwain seeds, Thymus serpyllum, I attempted to impart a bactericidal finish to cotton textiles[10]. Direct application, microencapsulation with acacia gum, cross-linking with resin, and a combination of these methods were used to include the extract. In direct application, the finish's resistance to washing was extremely poor[11].

C. Leaf Dyes and Antimicrobials

Color was obtained from the leaves of several plants in certain experiments. Eucalyptus camaldulensis, for example, is a significant source of natural polyphenols and tannins. Leaves having 11 percent quercetin as the main component, as well as other components such as rutin, gallic acid, ellagic acid, and other minor components, are extremely helpful in coloring yield and substrate durability. Wool fibers had a greater color strength than silk fibers, and both wool and silk were able to produce a broad range of colors, including yellowish brown with aluminum and copper, dark grayish brown with iron, and brilliant yellow with tin. Both substrates had UV protection, and textiles had excellent to very good wash fastness, as well as medium to good light and rub fastness. The tea plant, Camellia sinensis, is a rich source of antioxidants, flavanols, flavonoids, polyphenols, and catechins, among other helpful natural components. It is processed in a number of ways to create green, yellow, dark, white, oolong, and black teas. Deo and Desai looked into dyeing cellulosic textiles, cotton, and jute using an aqueous extract of black tea, where the tannins were the primary coloring agents. The black tea solution was mixed, heated, and allowed to boil for 30 minutes before being filtered and used as a black pigment for dyeing textiles using ferrous sulfateheptahydrate, alum, and copper sulfatepentahydratemordants. Jute textiles with a deep color tone and good to outstanding wash and light fastness were created[11].

D. Fruit Dyes and Antimicrobials

Plant fruits are another source of natural dyes, and their use in textile coloring has been widely researched. Pomegranate rind extract, for example, was utilized for a bi-functional treatment of cotton, which included both coloring and a bactericidal finish. Punicagranatum is a deciduous shrub or small tree that bears the pomegranate fruit. The dye was extracted using a water/ethanol solvent and was shown to have a high affinity for cotton. Wash, light, rub, and sweat fastnesses were achieved, as well as good antibacterial properties against common bacteria such as S. Aureus and E. coli. However, as washing cycles progressed, the antibacterial activity gradually deteriorated. Pomegranate peel has also been used to color wool and silk, either with or without mordants. The optimum dyeing pH was discovered to be 4, which resulted in grey and yellow colors on fibers, respectively, from iron and aluminum. Mordanting enhanced dye absorption and light fastness but had no effect on wash fastness.

DISUSSION

The emergence and spread of multi-drug resistance bacteria is a significant worldwide health care issue that poses a danger to human life. We must recognize that the fight against these germs is never-ending, but we may win by shifting our approach and returning to nature, utilizing active compounds derived from plants that have endured millions of years in the face of microbes. Following the demise of antibiotics, a large number of research on the antibacterial properties of selected medicinal plants against MDR and non-MDR microbes have been performed. However, only a small percentage of these attract pharmaceutical firms. Extracting medicines from therapeutic plants, especially those described in traditional and folk medicine, should be of serious attention. Hopefully, antimicrobial research based on medicinal plants will provide positive results.

CONCLUSION

We concluded from the research that the antibacterial activity of extracts of medicinal plants is dependent on a number of factors, including the plant material utilized, the method used, the growing medium used, and, most significantly, the microorganism examined. Plant material of higher grade should be used for better study. Both the solvent and the extraction method have the potential to change the ultimate outcome. The effects of various extracts of a medicinal plant may vary. In vitro studies of garlic revealed that the activity of garlic powder against most bacteria was higher than that of the plant or crude medicine; nevertheless, garlic oil has even more therapeutic potential. It was shown that the diethyl extract obtained after extraction of the aqueous suspension of the drug powder had moderate activity against Escherichia coli, but that no active extracts or fractions were found when a sequential extraction with petroleum ether, dichloromethane, dichloromethane–methanol, and methanol was used.

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AN OVERVIEW OF BIG DATA IN HEALTHCARE

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ABSTRACT

In the field of healthcare, big data has opened up a new door. Because of the many advantages and possibilities, it has piqued the interest of all stakeholders in the healthcare sector. This chapter seeks to provide you a broad yet in-depth knowledge of big data in healthcare. The healthcare of big data, as well as various healthcare data analytics, such as predictive and prescriptive analytics, is covered in this chapter. The obvious benefits of adopting big data technology in healthcare are discussed in detail. The application fields are also addressed, as well as a variety of actual use examples. Managing large amounts of data is always a difficult task. The chapter outlines all of the potential roadblocks to achieving the advantages of big data in healthcare. A short overview of the tools and platforms, architectures, and commercial infrastructures for healthcare big data is also provided in this chapter.Healthcare professionals are now persuaded of the advantages of Big Data and are convincing themselves to analyze the data in order to extract new insights that have provided them with promising new strands of knowledge that are being converted into creative and meaningful activities.

KEYWORDS:*Big Data, Healthcare, Medical, Public, Reduction.*

1. INTRODUCTION

The healthcare sector is undergoing a radical transformation. A huge quantity of data is being generated as a result of major advancements in digital, open, and ubiquitous healthcare systems. Because this healthcare data is similar to Big Data in both scale and type, it is referred to as healthcare Big Data[1]. Though the healthcare sector has lagged behind in the use of Big Data technology when compared to other industries, the changing medical and clinical environment has pushed stakeholders to dive into the development rapidly. Big Data has unexpectedly become critical for almost every operational, clinical, and managerial activity. Several applications in healthcare are well-suited to Big Data technology[2].

Healthcare Big Data analytics has opened up numerous interesting possibilities in various healthcare operations, such as diagnostic and medical treatment, clinical decision support, population health management, and so on. The success of healthcare Big Data is largely reliant on the effective gathering and storage of vast amounts of heterogeneous data obtained from a variety of sources, as well as the analysis of that data. The proper use of healthcare Big Data and information gained via analytical procedures has the potential to save a considerable amount of money and, more significantly lives[3]. Our period has been dubbed the "electronic age," and the amount of data produced is increasing at an exponential pace. As a result, an increasing number of businesses are grappling with the challenge of handling enormous quantities of data. Many sources, including corporate operations, transactions, and social networking sites, create a data Btsunami that persists in both organized and unstructured forms.

There are many legal methods and purposes for collecting and analyzing these data sets, including invoicing, inventory, forecasting future requirements, and many more[4]. This data avalanche is often referred to as Big Data, and it is one of the most challenging problems that businesses confront today. According to Richards and King, our community is one step away from a Big Data Revolution, similar to the Industrial Revolution, since it has the potential to impact all aspects of human life (e.g., health, education, voting, law enforcement, and cyber-security). The processing and analysis of massive amounts of data is a difficult job. To manage and analyze Big Data, a variety of techniques and technologies have been created[5]. These methods are based on mathematics, statistics, computer science, and economics, among other disciplines. These processes imply that, in order to extract value from Big Data, an organization must adopt a more flexible strategy that is interdisciplinary in nature. Experts from a variety of disciplines and backgrounds are interested in gaining access to large amounts of data and debating the possible advantages and costs of studying it. The current tendency is to shift from in vivo to in silico, since novel research may arise from the study of existing data sets[6]. The impact of Big Data is so great that these data mountains and analyses are changing the way science progresses. Furthermore, there is a critical need to combine or even replace laboratory experimental data with data from in-field use, which provides insight into real-world stressors.

Big Data's significance and potential are enormous, and many academics have already worked on related problems. This article focuses on a distinct set of issues, those concerning ethics and difficulties that arise as a result of the usage of Big Data in the Healthcare era[7]. In general, experts anticipate that the digital revolution will improve healthcare quality, reduce costs, and offer doctors and researchers with new tools and resources derived from vast healthcare data sets and resources. This article summarizes some of the most important debates about the difficulties and ethics of big data in healthcare. The focus of the article is on the effect of Big Data on society, but its impact on individuals is also shown. The emphasis is mostly on the impact on society, the general public (customers, citizens, and patients), and Big Data users (both those who created the data and those who utilize it for study).

The purpose of this article is not to provide a thorough overview of Big Data technologies, but rather to increase awareness of the issues that healthcare professionals must deal with. We want to provide you a broad overview of Big Data in Healthcare as a discipline. First and foremost, we will examine the difficult concept of Big Data. Second, we explain the Big Data issue in general. The framework for Big Data in Healthcare is given in the third section. Finally, we developed a three-dimensional model for evaluating Big Data issues in the medical field. This approach is intended to identify and analyze the difficulties and ethical concerns that Big Data in Healthcare brings up. Finally, recommendations for further research and conclusions are made. Big Data is characterized by enormous data quantities (terabytes and beyond) and a variety of data kinds (structured, unstructured, semi-structured, and poly-structured data) derived from diverse data sources that are frequently geographically dispersed. The proliferation of fresh data is so large

that analysts estimate that 2.5 times 1018 bytes are created each day. Rather than Terabytes, we're talking about Petabytes, Exabyte's, Zettabytes, and even Yottabytes. Big Data, which is expected to rise to 5247 gigabytes for each of the world's human population by 2020, and Big Data Mining are already commonplace.Despite the fact that Big Data is a recently created and frequently usedphrase, Boyd and Crawford argue that it is a bad term in many respects.

As the quantity and diversity of data grows, describing Big Data as a catchall phrase may be difficult. Big Data is often defined in technical terms as "data that exceeds the processing capability of traditional database systems". The phrase Big Data refers to enormous amounts of data that are larger than the capacity of most widely used software tools to collect, manage, and analyze the data in a reasonable amount of time. Big Data volumes are presently ranging from a few terabytes to several petabytes of data per data set Manovich observed that the phrase "big data" has been used to "data collections large enough to need supercomputers"[5]. The ability to explore, combine, and cross-reference huge data collections is referred to as Big Data. Big Data is defined as "large volumes of high velocity, complex, and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of the information," according to a report presented to the United States Congress in August 2012[8].

1.1 Advantages Of Big Data In Healthcare:

Healthcare Big Data is created by digitizing data from patient records, medications, medical imaging, laboratory, pharmacy, and insurance. This massive quantity of data has the potential to provide knowledge trails that would enhance the quality of medical and healthcare services considerably[9]. The Big Data analysis would provide useful insights that would aid in making informed choices, illness monitoring, and other medical and healthcare services. The inferred information will be beneficial to patients, doctors, healthcare organizations, pharmaceutical firms, legislators, and other stakeholders. Individual and people in mass health surveillance; predicting individual health issues such as calculating the medical complication and risk associated with a patient, disease progression or progression; analysis of the particular kind of treatment suitable for the person; analysis of current treatment strategies to detect whether the diagnosis and applied treatment are correct; analysis of current treatment strategies to detect whether the diagnosis and applied treatment are correct; analysis of current treatment strategies to detect whether the diagnosis and applied treatment are correct; analysis of current treatment strategies to detect whether the diagnosis and applied treatment are correct; It may provide information about the patient's present and future health, allowing them to make more educated decisions. The incorporation of Big Data applications into existing medical and health services is beneficial in terms of scaling health care quality and accountability some of the benefits are described below[10].

- **Health-Care Cost-Reduction***:* The current healthcare system is built on a disease-centered paradigm, in which doctors recommend therapy based on illness symptoms and test results. Treatment is based on clinical knowledge and medical data, and additional treatment choices are recommended depending on treatment outcomes. Recursive, time-consuming, and expensive treatment methods are used. With the massive quantity of data on medical situations, treatment patterns, medications and their efficacy, and genetic data, healthcare Big Data provides for a patient-centered therapy approach. This information enables for accurate patient analysis and diagnosis, as well as the prediction of the proper therapy plan. Big Data in genomics, for example, allows for customized profile and, as a result, tailored medication for patients, allowing for precise treatment. Big Data inferred knowledge in healthcare really reconciles the redundant and expensive treatment process.

- **Reducing Hospital Readmissions:** Patients are more likely to return to the hospital within a month after receiving therapy. The hospital will have to pay for this in terms of both money and resources. Patients at risk of medical problems and readmission may be identified using Big Data analytics applied to their medical records, histories, chart information, and lifestyle records. As a result, identifying patients who need extra care may help decrease hospital readmissions.
- **A Workforce That Is Optimized:** Hospitals and other health-care institutions are grappling with the age-old issue of staffing and scheduling. There is a danger of underutilization of resources if a large number of people are hired, yet reducing the number of people may result in bad customer service. The use of Big Data may help solve this issue. Big Data can accurately estimate the number of patients who will arrive on a daily and hourly basis using data gathered from different sources. In addition, analyzing hospital admission records over a period of years may provide insight about the kind and quantity of patients who will be admitted to the hospital in the future. When data science is used to crunch raw data, it produces knowledge that allows the company to optimize its personnel based on future needs.
- **Notifications in Real Time:** Real-time alerting is one of the most valuable features of Big Data. When Big Data is integrated into hospital and clinic services, it may analyze patient medical data in real time and give recommendations to doctors for prescriptive decisions. Further, data gathered by wearable devices is analyzed in the cloud in conjunction with Big Data to provide real-time information about a patient's present medical problems, future medical illness, and preventative actions. The physicians would be able to examine the health condition of individuals in society and, as a result, take remedial action if any deviations were noticed based on the data gathered over time. The health organization also uses real-time data to respond quickly to any alarming patient monitoring findings.
- **Examining EHRs:** A clinician may get a better understanding of treatment patterns, effects, and adverse effects by analyzing the massive electronic health record. Furthermore, Big Data enables physicians to share updated patient data for treatment, as well as medical situations, eliminating duplication tests and treatment procedures.
- Analyzing Hospital Networks: Analyzing hospital care and management data could be useful in administering critical medical condition cases, developing strategies for reducing postoperative infection, and examining the medicine (antibiotics) and treatment procedures used by doctors that were found to be ineffective in curing patients.
- **Public Health Control Data:** Medical and health organizations, hospitals, and small clinics generate massive amounts of medical information. For medical experts, there is a lot of data. Because the majority of the data is unstructured, cluttered, and raw, medical professionals and policymakers may find it challenging to utilize these data in their raw form in public health legislation and decision-making. There's a disconnect between what doctors desire and what data is available. These data are useless until they are combined with Big Data. Data analytics may be used to standardize and regularize public health data, filling in gaps and giving information that can be used in different regulatory and research efforts to improve care and health services.
- **Medical Procedures That Are More Efficient:** Big Data assists in the delivery of excellent patient care. Big Data analytics provides physicians with information on illnesses, their symptoms, treatment patterns, and drug efficacy at various phases of sickness, allowing them to treat patients more effectively.

- **Informed Strategic Planning Based on Health Data:** Big Data on public health data like vaccinations, distribution, and availability of medical services allows for the development of public health plans in the event of disease outbreaks or an increase in the incidence of chronic illness among the population. Big Data may be used to map needed services throughout an area in contrast to existing services, allowing for inferences about what actions are required to address public health problems.
- **Health-care workflows:** Multiple departments, limited patient admitting capacity, limited physicians and personnel with variable schedules, and a varying flow of arriving patients with various needs and treatments make hospital healthcare services highly dynamic. The patient's health problems are complicated by the fact that they need care from several departments and doctors at various phases of therapy, as well as laboratory testing and medicines. In addition, there have been instances of medical complications as a result of incorrect diagnosis and treatment, as well as hospital readmissions. This high-risk environment necessitates a meticulously designed and controlled process that is ready for an emergency and changing circumstance. Healthcare data enriched by multiple sources of data such as real-time patient data (patient health status, location, etc), medical records of patients, nursing information, laboratory data, and machine status (available, working, etc.) assists in identifying the current operational state of the hospital and thus allows for informed decision making for better healthcare services by maximizing resource utilization.
- **Improved Safety Methodologies:** Postoperative infections are often suspected in individuals who have had surgery. Big Data analytics of electronic medical records may provide valuable insights about a patient's vulnerability to infection in the past. Preventative measures such as rigorous surgical care, pre- and postoperative preventive medicine, and so on are ensured.
- **Patient Participation:**Patient engagement, which leads to patient awareness, retention, and proactive treatment, is one of today's healthcare problems. The healthcare sector receives a lot of funding, yet patients are never adequately cared for, resulting in more serious health issues. Insights, communication, personal wellness monitoring, medical management, new illness diagnosis, personal history, vaccination, health cost planning, social services research, and clinical trial involvement are all examples of patient engagement. Patients want to be involved because they want to be informed, involved, and confident. This increases the pleasure and experience of patients, resulting in a better outcome. Interactions with doctors, hospital and clinic staff, pharmacies and pharmaceutical companies, laboratories, and other counseling personnel improve patient involvement. Controlled and up-to-date information on the patient enables the service provider to tailor services to the patient's needs, allowing people to become more involved in the management of their health problems. Big Data has played a larger role in recognizing the issue.Healthcare professionals may use Big Data knowledge to identify people who have a serious illness or who need assistance with insurance, medical counseling, treatment, and management of their medical situations. These individuals are kept up to date on a regular basis. Patients are either texted or phoned with a customized message. People become more conscious of their own particular path as patients as a result of the customized messaging. When a patient contacts a clinic or hospital for healthcare, the physician or hospital staff may already be aware of the patient's history, communication preferences, and healthcare journey thanks to Big Data technology.
- **Big Data Is Aiding in the Prevention of Unnecessary Emergency Room Visits:**Patients often visit numerous hospitals and clinics for the same or different illness or disease, resulting in repeated treatment procedures, treatment discontinuity, and, in the worst-case scenario, incorrect therapy, putting their health in danger and wasting money and time. In

this regard, the use of Big Data would assist patients in minimizing needless trips to medical and health authorities, as well as ensuring that treatment is on track. When a patient transfers between hospitals/ clinics or receives a new treatment for an illness, the staff will be aware of the patient's medical history, treatment procedures performed, drugs given, and the results of different lab tests that have previously been performed thanks to Big Data. This significantly simplifies patient diagnosis, lowering patient workload and improving patient satisfaction.

2. DISCUSSION

Life science and healthcare are flooded with information and data sets in the era of Big Data. There are many views on instability and difficulties in the region, but changes are taking place in many areas to address them. As Mateo Sian points out, the field of Big Data is barreling down on us like a freight train. As a result, the growing problems of Big Data cannot be overlooked, and they must be thoroughly investigated and appropriate measures taken in many areas. The achievement in overcoming the interoperability of the necessary Big Data management systems is an important step in this approach.Additionally; steps should be made to improve data gathering and storage. Experts in healthcare information technology should create software that can manage data from EHRs. Experts should also assess error rates and describe the degree of data accuracy uncertainty. The bottlenecks in healthcare Big Data are many, and they are not limited to the problems described in the sections above. Accuracy problems (healthcare datasets are full of biases), consistency (standards need to be established), and facility (tools should be developed to allow patients to correctly self-report data) are some of the obstacles that are especially linked to healthcare Big Data. To reap the benefits of Big Data, healthcare companies must commit time and money to its management. Healthcare companies should also create an intelligence center with a focus on Big Data and mobile computing, and develop a plan based on their goals and technical maturity. They should also work with partners that can assist them with hosting and programming platforms, security concerns, internally and externally integration, and app development.

3. CONCLUSION

In recent years, Big Data has had an impact on virtually every industry. The healthcare industry is no exception. The healthcare sector, in reality, is the leading generator of digital data. In the field of healthcare, big data technologies have opened up new possibilities. It has benefited not only the patients, but also the healthcare facilities and hospitals. Adoption of the appropriate Big Data technologies and the underlying architecture should be carefully considered to maximize the advantages. Despite the fact that Big Data technology has had a major effect on contemporary healthcare, it still has to advance in order to reach its full potential. The conventional healthcare system is still struggling to adjust to the "major" shift. Nonetheless, Big Data has put the healthcare sector on the correct track toward fast change, that will undoubtedly benefit humanity.

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A REVIEW DATA MINING TECHNIQUES FOR THE ANALYZATION OF BIG DATA: A REVIEW

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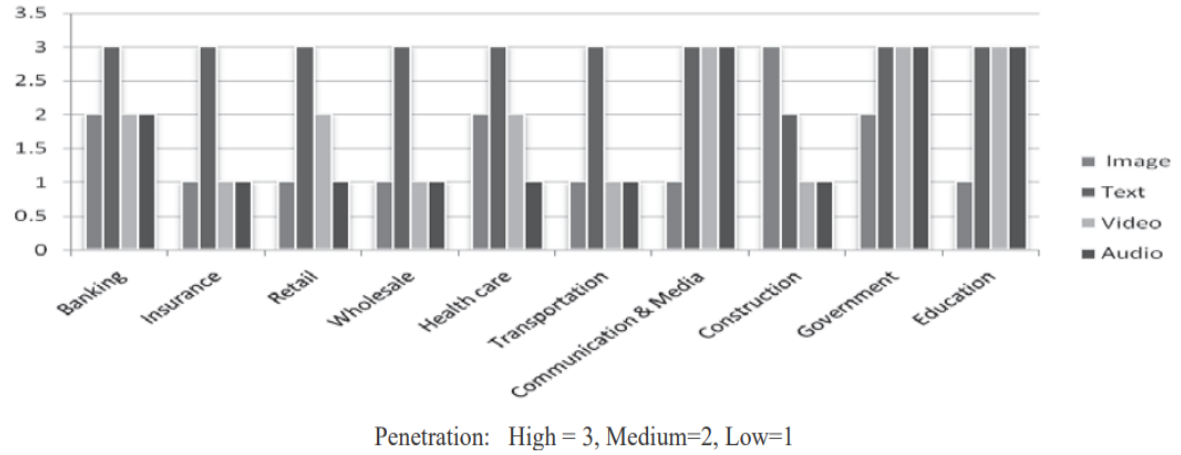
ABSTRACT

Big Data is a new idea that covers cutting-edge methods and technology for analyzing huge volumes of complicated information produced at different speeds and from diverse sources. Data mining methods are proving to be very useful in the field of Big Data Analytics (BDA), since dealing with large amounts of data poses significant difficulties for applications. The capacity to extract valuable information from massive databases is known as big data analytics. The significance, difficulties, and uses of Big Data in many areas, as well as the various methods utilized for Big Data Analysis utilizing Data Mining techniques, are discussed in this paper. The results of this study provide scholars with important information about the major trends in Big Data research and analysis utilizing various analytical domains.

KEYWORDS:*Big Data, Big Data Analytics, Big Data Application, Data Mining.*

10. INTRODUCTION

In our digital age, analysts have access to massive quantities of data. Big Data is a phrase used to describe a collection of unstructured, semi-structured, and structured information that are challenging to gather, manage, process, or analyze using traditional database software tools and technologies due to its volume, complexity, and pace of development. Text, video, picture, music, website log files, blogs, tweets, location information, sensor data, and more formats are used. Smart and scalable analytics services, programming tools, and apps are required to extract valuable information from such large datasets. The data comes in a variety of forms, including audio, video, pictures, and text, and it varies by industry. Text data is handled by the banking, insurance, and health-care industries. Audio and video data are heavily influenced by communication and media. Fig. 1 demonstrates how, based on the kinds of data produced and stored, there are differences in the quantity of data stored in various sectors.



Penetration: High = 3, Medium=2, Low=1

Fig. 1: Various sectors produce and store different kinds of data.

Data mining, also known as Knowledge Discovery in Databases (KDD), is an analytical technique used in a variety of fields to find meaningful connections between variables in big data sets. Analyzing large amounts of data in a short amount of time may lead to new insights and theoretical ideas. Big data has the potential to help businesses improve their operations and make quicker, more informed choices.

Data mining is the process of examining and analyzing large amounts of data in order to uncover patterns in big data. The methods were derived from statistics and artificial intelligence (AI), with a dash of database management tossed in for good measure. Data mining usually has one of two goals: categorization or prediction. The goal of classification is to organize data into groups. A marketer, for example, may be interested in the characteristics of individuals who reacted to a promotion vs those who did not. There are two types of classes. The goal of prediction is to forecast the value of a continuous variable. A marketer, for example, may be interested in forecasting who would react to a campaign.

11. LITRATURE REVIEW

This part includes a thorough assessment of the literature from a variety of publications, academics, and other online sources. It is split into two halves. The first section is an overview of Big Data's significance, difficulties, and applications in different areas. The second section covers the various methods to Big Data Analysis and their results using various Data Mining techniques.Wei Fan et al. provided an overview of big data mining in 2012, including its current state, debate, and future predictions [1].Kauret al. discussed a variety of Big Data problems[2]. They also discussed how Big Data analysis may help address certain operational, financial, and commercial issues in aviation that were previously intractable due to economic and human resource limitations.

S.Vikramet al. demonstrated the five aspects in which big data varies from ordinary data: volume, velocity, variety, value, truth, and complexity[3]. They discussed how large data systems are handled using the Hadoop framework. The authors also focused on the difficulties that businesses must confront when dealing with Big Data, such as data privacy, search analysis, and so on.D. Agarwal published a thorough research on data mining, models, issues, and applications in 2013 [4].D. Kishor proposed changing the fundamental concept of Big Data from 3V to 3C in order to better explain Big Data analytics using mathematical and statistical methods[5].In 2014, R Gupta et al. presented an overview of big data, its significance, big data technology, and how big data can be used to self-organizing websites, which can be extended to the area of advertising in businesses[6].

Big Data's content, scope, techniques, privacy, security, samples, benefits, and difficulties were all discussed by S. Sagiroglu et al[7]. They discovered that the difficulties were not only in collecting and managing data, but also in extracting valuable information from that data.In 2014, Xindong Wu et al. proposed the HACE theorem, which defines the characteristics of the Big Data revolution and offers a Big Data Processing model from a Data Mining perspective [8].Healthcare, networking security, market & business, education system, communications, and other real-time uses of big data were given by the authors Sabiaet al[9].B. Thakur et al. reviewed several kinds of big data in 2014, as well as major difficulties in big data management and analytics that emerge from the nature of data, which is vast, varied, and changing [10].In July 2015, the author Vatsal Shah examined huge amounts of unstructured data in the form of video and proposed a solution utilizing the Hadoop platform [11].

12. DISCUSSION

12.1. Big Data:

Big Data encompasses not just a huge amount of data, but also additional characteristics that set it apart from the notions of "extremely big data" and "massive data." In reality, there are many definitions of Big Data in the literature. “Big Data technologies represent a new generation of technologies and architectures intended to cheaply extract value from extremely large quantities of a broad range of data, by allowing high-velocity collection, discovery, and/or analysis,” according to the International Data Corporation (IDC). Big Data is defined by the McKinsey Report as "data sets that are too large for traditional database software tools to collect, store, manage, and analyze."

The three Vs, or Volume, Variety, and Velocity, are often used to characterize Big Data. The size of the data is represented by the volume. Velocity refers to the rate at which real-time data is generated and delivered. Because data originates from a variety of sources, as illustrated in Table 1, the data becomes too large.

TABLE 1: DIFFERENT TYPES OF BIG DATA & ITS SOURCES

Data Types	Sources	Formats
Structured	Business Applications such as retail, finance, bioinformatics etc.	RDBMS, OLAP, Data warehousing
Semi-structured	Web Applications such as web logs, email, webpages	XML, CSV, HTML, RDF
Unstructured	Images, Audio, Video, Sensor data, Blogs, Tweets etc.	User generated text content

The following Big Data definitions offer a collection of tools for comparing Big Data to conventional data analytics. Table 2 summarizes this comparison using the 3Vs (Volume, Velocity, and Variety) dimension.

TABLE 2: COMPARISON OF BIG DATA AND TRADITIONAL DATA

Characteristics	Big Data	Traditional Data
Volume	Terabyte, Petabyte, Exabyte	Gigabyte
Velocity	More rapidly	Per hour, day
Variety	Structured, Semi-structured or Unstructured	Structured
Data integration	Difficult	Simple
Data access	Real time or batch	Interactive
Source of data	Fully distributed	Centralized

The study of Big Data is at the heart of contemporary research and industry. Because a large quantity of data is produced from a variety of heterogeneous sources, storing, extracting, transforming, and loading it becomes challenging. According to a recent study, Google receives over 4 million search queries per minute, e-mail users send over 200 million emails, YouTube users upload 72 hours of video, Facebook users share over 2 million pieces of content, Facebook processes 350 GB of data per minute, more than 570 websites are created per minute, and Twitter users send 277,000 tweets per minute. According to estimates, the produced data constituted approximately 5 exabytes until 2003, 2.7 Zettabytes until 2012, and is projected to grow fourfold by 2016. Astronomy, social media/entertainment and networking sites, life sciences, healthcare, video surveillance, government data, sensor technologies and networks, mobile devices, and other fields all have large datasets.The Fig. 2 shows the data in Exabyte (EB) for the year 2005-15[12]. The quantity of data was rapidly expanded throughout this time owing to the major contribution of Big Data Analytics, as seen in this graph from 2005 to 2015.

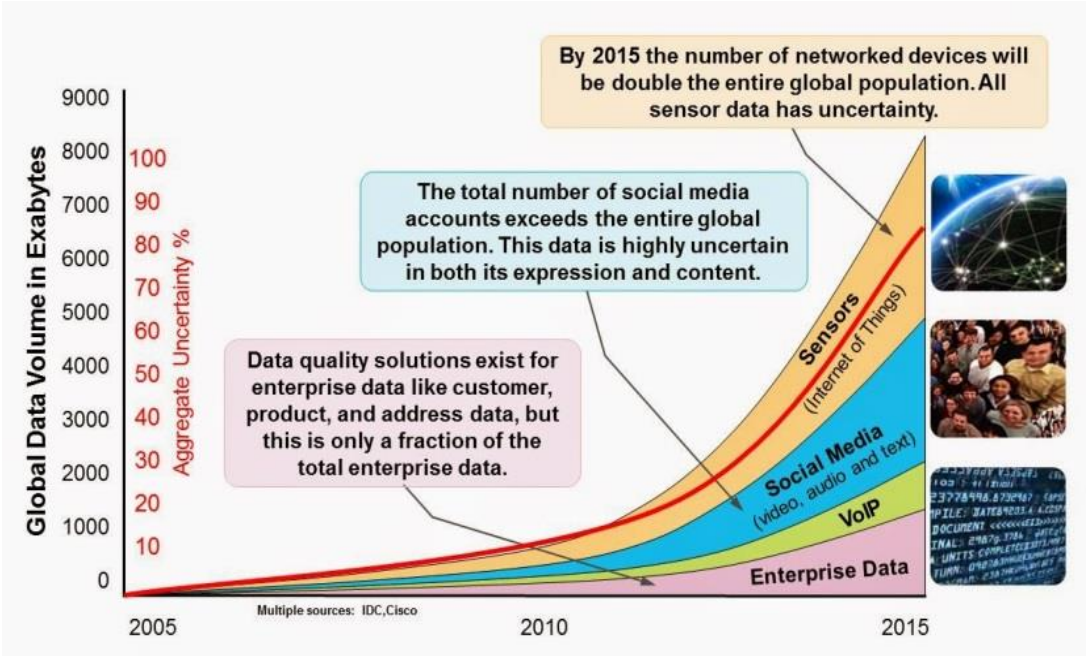


Fig. 2: Illustrates exponential data growth[12]**.**

Several difficulties that businesses or media must confront when dealing with Big Data include capturing Big Data, its length, storage, sharing, analysis, display of enormous data, and, of course, the most essential technology. For this, new architecture, algorithms, and methods for implementation are required. It also requires technological expertise. As a result, specialists are required to deal with Big Data using this new technology. Technical Challenges, Data Management and Sharing, Privacy, Security and Trust, and Misuse of Big Data are all issues that must be addressed while analyzing Big Data.

12.2. Data Mining:

Because there is a lot of data out there with a lot of hidden knowledge, data mining has become a hot topic in the information business. Indeed, we might argue that data mining is a relatively recent scientific study topic in the fields of statistics, machine learning, database management science, and visualization that aims to find and display information in a way that humans can comprehend. The goal of data mining is to extract hidden information from huge amounts of data. This information may assist and support organizations in making better and more informed choices.The potential for data mining algorithms to generate millions of patterns and rules is enormous. Knowledge is represented as an intriguing pattern. The discovery process may be guided by objective or subjective measures of pattern interestingness. There are a variety of common models that may be utilized to solve various data mining issues. Among them are Nave Bayes, Decision Trees, Neural Networks, Support Vector Machines, and K-means.

12.3. Big Data Analytics & Process Model:

Big Data Analytics is a tool that allows businesses to analyze huge amounts of data in order to find patterns and other valuable information. The quantity of data has grown rapidly over the last decade, from 2005 to 2015. This is due to the substantial contribution of Big Data Analytics. The following are examples of technical advancements in Big Data storage, processing, and analysis:

- In recent years, the cost of storage and CPU power has dropped dramatically.
- The creation of new frameworks, such as Hadoop, that enable users to take use of distributed computing systems capable of storing huge amounts of data and processing it in a flexible parallel manner.
- Datacenters and cloud computing's flexibility and cost-effectiveness for elastic processing and storage.

The Process model for Big Data analytics is the focus of this section. The entire model is split down into two sub-processes: data management and analytics, which are further separated into five phases as shown in Table 3.

TABLE 3: PROCESSES FOR EXTRACTING INFORMATION FROM BIG DATA

Big Data Processes	
Data Management	**Analytics**
1. Acquisition & Recording 2. Extraction, Cleaning & Annotation 3. Integration, Aggregation & Representation	4. Modeling & Analysis 5. Interpretation

TABLE 4: TAXONOMY OF BIG DATA ANALYTICS

Analysis Domain	Characteristics	Approaches	Techniques	Source of Data
Structured Data Analytics	Structured records, less volume and real time.	Statistical Analysis	Statistical Machine Learning. RDBMS, OLAP, Data Warehouse	Business & Scientific Data.
Text Analytics	Language dependent, Unstructured, Semantic, Rich Textual.	Text Mining, Opinion mining or Sentiment Analysis, Summarization, Question Answering System, Natural Language Processing (NLP).	Clustering, Neural Network, SVM, Decision Tree, Naïve Bayes	Emails, logs, Blogs, Twitter, Facebook, Webpage, Corporate documents, Government Rules and Regulations etc.
Web Analytics	Integration of Text and Hyperlink, Symbolic, Metadata	Web Content Mining, Web Usage Mining, Web Structure Mining	Classification and Clustering.	Various Web Pages
Multimedia Analytics	Collection of Audio, video & image	Indexing & Retrieval, Summarization, Error detection, annotation	Multimedia annotation, Video Summarization, audio Summarization	User generated multimedia, surveillance, healthcare media, corporation produced multimedia.
Mobile Analytics	Fragmented data, person specific	Monitoring	Location based mining	Mobile phone applications, sensors

The most crucial step of the Big Data Process model is data analysis. This model's aim is to derive valuable insights and conclusions that will aid in decision-making. The goal of data analytics is to collect as much information as possible that is relevant to the topic at hand. The researcher discovered that the produced data is separated into different areas of Big Data applications in Big Data Analytics. Structured Data Analytics, Text Analytics, Web Analytics, Multimedia Analytics, and Mobile Analytics are a few of them.Table 4 highlights all five kinds of Big Data applications, which are grouped by data type and include data features, various methods and techniques, and data sources. Data analytics deals with information about a phenomena acquired via observation, measurement, or experimentation.

13. CONCLUSION

In the past decade, the exponential increase in data capacity and complexity has prompted much study in the area of big data technology. We have attempted to synthesize the current literature review year by year in the field of Big Data and its analysis using various analytics methods in this article. Text analytics, which is regarded as the next generation of Big Data, is now widely acknowledged as a mainstream method of extracting valuable information from millions of opinions posted on social media. Because of the strong interest in real-time data of rich picture and video material, video, audio, and image analytics techniques have scaled with advancements in machine vision, multilingual voice recognition, and rules-based decision engines. They are possible answers to a variety of economic, political, and social problems.Our future work will mainly concentrate on the Big Data analytics method mentioned above, which will be implemented utilizing different data mining approaches.

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DIRECTION OF TALENTED AND TALENTED STUDENTS FOR RESEARCH IS AN IMPORTANT FACTOR IN THE DEVELOPMENT OF SCIENCE AND PRODUCTION

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ABSTRACT

The introduction of a two-tier system in higher education, the introduction of training in specialties is the current implementation of the "National Training Program". At the same time, the training of talented specialists in accordance with the requirements of the state, society, science and industry is extremely important. The purpose is to find and train talented and gifted students, to develop their research skills, to encourage them to address pressing issues in society, science and industry, to develop the intellectual and scientific potential of the state and society of Uzbekistan.

KEYWORDS: *Talented and Gifted Students, Education System, Educational Process, Science and Production, Creative Approach, Students with Talent and Creative Potential, Talented And Targeted Training Of Gifted Students, Selection Of Gifted Students.*

INTRODUCTION

The process of identifying and selecting talented and gifted students, working with them individually and directing them to effective research on the basis of a creative approach of young people by the order of the Ministry of Higher and Secondary Special Education No. 137 of 1998 It is organized on the basis of the approved "Regulations on the search, identification and targeted training of gifted students" and the normative documents developed in the educational institution on the basis of these regulations. This process involves the following steps:

-Search, identification, discovery of talented and gifted students;

-Realization of their inner intellect and potential through targeted training of talented and gifted students;

-Targeted orientation of students with special scientific talent and creative potential to research activities;

- creating the necessary conditions for students to conduct research, expanding the volume of scientific and methodological resources;

- Supporting the scientific aspirations, creative pursuits and material and spiritual stimulation of talented and gifted students.

It is recommended to identify and select talented students in the following order:

- to hold a competition of gifted students at the end of the academic year, mainly among students of 1-2 courses, in case of interest and desire of 3rd year students;

-Orientation of gifted students from the 2nd year to research and development on an interesting and topical topic, taking into account their scientific interests and inclinations;

-Identification of talented and gifted students involved in research, development of selection criteria and standards;

- to study and evaluate the creative abilities of students, to invite them to the membership of the Council of Young Scientists on the basis of specially prepared tests, practical and theoretical assignments;

- Organization and holding of competitions for gifted students;

- Identify the potential and intellectual potential of gifted and talented students using pedagogical and psychological research methods.

Scientific and creative work with gifted and talented students, identified and selected on the basis of special competitions, can be organized in the following forms:

- Involve students in conducting research on interesting and topical scientific topics in the framework of the main research problems of the department under the scientific guidance of experienced specialists;

- To teach students to organize and plan research on a selected scientific topic, to develop in them the skills of preparing scientific articles and reports on the basis of preliminary findings of practical and experimental work;

- Involve them in participation in fundamental, practical and innovative projects implemented through the activities of schools of young scientists, scientific communities, as well as scientific laboratories;

-Organization of training courses on the basis of special plans and programs for in-depth study of foreign languages, information technology, history of Uzbekistan and the works of the President;

-To prepare and ensure their participation in inter-university, national and international competitions (Olympiads, competitions, conferences, etc.);

-To send students to educational institutions of developed countries for training and research trips.

The Young Scientists Council may make a number of recommendations to the administration based on the results of its work with talented and gifted students. Including:

-Organization of scientific seminars for students on the basis of scientific results of research, selection of reports;

-To closely assist students in publishing small scientific and creative materials based on the results of their scientific and creative work in the form of books and collections;

-Rewarding and encouraging the work of talented and gifted students and their supervisors, their special achievements, their candidacy for state awards, various contests and competitions, work in scientific and public organizations of the university. To recommend

The main activity of the School of Young Scientists, which operates under the departments of pedagogical universities, is aimed at attracting talented and gifted students to research, the formation and development of their scientific outlook. Therefore, it is necessary to provide additional education to talented students through the clubs organized by the School of Young Scientists. Clubs and their leaders play an important role in engaging students in research. The quality of training of scientific and pedagogical staff through higher education institutions often depends on the effectiveness of the club leader in organizing the work of directing students to scientific activities.

The main object and subject of the circle leader's activity is the student. The leader of the circle is required to take a creative approach to the organization of student activities. At the same time, the leader of the circle must achieve the student's recognition as an ideal person with scientific potential. The leader of the club has a responsibility to be an exemplary, exemplary teacher. This requires him to have professional knowledge, skills, abilities and scientific potential, as well as high human qualities, morals and a high level of culture.

In order to develop research skills in future teachers, the club leader is required to perform the following tasks:

1) Have a complete knowledge of the scientific and creative abilities of each student involved in the circle;

2) To be able to correctly select from the group of students students with research skills who can engage in research activities;

3) Be able to direct students in the group to work with scientific resources;

4) Be able to focus the talents, potential and interests of students in the group on solving specific science problems;

5) Individual work with each student on a specific scientific problem;

6) Ensuring pedagogical cooperation and communication of students with science teachers;

7) Creating opportunities for students to develop research skills;

8) Comprehensive encouragement and support of students' research abilities;

9) Creating a positive scientific environment among group members;

10) Active promotion of students' scientific achievements among the public;

11) To educate students on the principles of devotion to scientific work, love of certain sciences, honesty in science, perseverance;

12) To establish strong scientific ties between students and various scientific societies, the youth social movement "Kamolot", etc.

Students should be taught to analyze scientific phenomena and approaches independently, and to think critically about a particular scientific concept. Therefore, an important condition for the involvement of students in scientific activities is to equip them with existing scientific problems and practical and theoretical knowledge aimed at their solution, modern scientific information and the conditions for their solution. This requires the gradual expansion of the scope of scientific research, the formation of students' scientific outlook and thinking through the constant introduction of new scientific approaches.

Of particular importance are the programs developed by club leaders to promote student research. Such programs provide practical assistance to students in conducting their research and conducting research in a systematic manner.

The study of historical and scientific heritage and its use in the educational process will lay the foundation for the search and formation of young researchers in the future on the basis of "small scientific schools" in higher education, resulting in the creation of new modern scientific schools. Opportunities arise.

In the development of educational and scientific schools in the Middle Ages al-Khwarizmi, Mahmud Chaghmini, al-Bukhari, al-Termizi, al-Farghani, ar-Razi, Farabi, Abu Bakr al-Khwarizmi, al Pedagogical and didactic views of such great scholars as Beruni, Ibn Sino, Yusuf Khas Hajib, Ahmad Yassavi, az-Zamahshari, SulaymanBaqirgani, Mahmud Kashgari, Sheikh NajmiddinKubro, JaloliddinManguberdi, Ahmad Yugnaki, Pahlavon Mahmud, BahovuddinNaqshband worth noting. Consequently, the legacy of the named scholars still plays an important role in improving the educational process and technology.

The legacy of our ancestors is rich in information about the development of science and the individual, the opportunities for the development of intellectual potential. Finding ways to use this heritage effectively in modern education is a pressing issue. Educating young people in the spirit of national values and traditions, directing them to the right choice of profession, deciding on high human qualities, explaining the role and importance of scientific schools based on the traditions of "teacher-student", it is especially important to cultivate a sense of pride in the scientific and intellectual potential of our ancestors. To do this, every student at the university should be aware of the unique and rich historical heritage of our characters.

Experience has shown that the reorganization of science circles in accordance with the requirements of the time and social order, to focus on the issues of broader expression of the achievements of a particular science in the content of future-oriented modular training and attract the attention of young scientists. it is necessary to For example, the small school of pedagogical professionalism established at the Department of Pedagogy and Psychology of the Faculty of Pedagogy of Gulistan State University combines the circles "TafakkurGulshani", "Pedagogical Technologies" (headed by senior teacher O. Suvonov). On the basis of a special questionnaire on the subject of pedagogy, schoolchildren, academic lyceums and university students in the system

of continuing education are selected. The advantage of the "small school" over the school clubs is that the lessons are conducted in a non-traditional way: in the form of discussions, didactic and role-playing games, as well as non-traditional educational lessons. It develops students' research skills, creates full conditions and freedom for each member of the small school to express themselves in scientific and creative activities.

Science clubs organized within the departments of higher education institutions usually operate on the basis of a specific program, involving students of the course and faculty. The activities of the reorganized science circles at the department on the basis of period and social order are mainly aimed at solving a wide range of problems, including general secondary education, secondary special, vocational education and higher education. Pupils and students of educational institutions, and even pedagogical staff are widely involved. For example, 17 out of 40 participants of the "Small School" organized by the Department of "Pedagogy and Psychology" of Gulistan State University are students and teachers of Gulistan and surrounding educational institutions. Based on the main research problem of the department "Theory and practice of shaping the professional culture of the future teacher", scientific and creative research is conducted in 4 areas. Each direction is supervised by a leading specialist of the department. Preliminary results of the research will be discussed in detail with the participation of members of the circle. Conclusions will be made on the continuation of the study on the results of the positive feedback, and on the retraining of the research on the results of the objection.

It is important to pay close attention to science in the work of the circle. Because on the basis of scientific conclusions the necessary knowledge and concepts are formed. To do this, it is necessary to study the many sources and identify, expand the information contained in it, to involve students, masters, graduate students and professors in the education system to adapt them to education. Efforts should be made to solve problems together.

In accordance with the "National Training Program" in the education system of the republic, a lot of work has been done to introduce modern pedagogical and information technologies in the educational process, to ensure the continuity of educational content. In order to study and solve the problems of continuing education, it is advisable to establish "Small Schools" under the departments, which are part of the "Small Academy". Such "schools" include science circles based on the traditions of "teacher-student" and, based on the requirements of the time, provide scientific and methodological cooperation between general secondary, secondary special and higher education. It is a structure that studies the current problems of the process, which will have the opportunity to conduct research within the School of Young Scientists. Therefore, it is necessary to study, clarify, supplement the historical data on the research problem, as well as to identify and highlight the issues that have not yet been fully explored. The implementation of the results in the educational process will be the basis for the modernization of pedagogy in the country and the development of its new branches, as well as the creation of new educational technologies.

In the state program for the development and perspective of pedagogical science, pedagogical science as a priority area of science in the Republic of Uzbekistan serves the development of the independent state and society of Uzbekistan, educational models and technologies based on new pedagogical theories of continuing education. The need to increase the effectiveness of training

on the basis of equipping with weapons, the need to determine the goals, objectives and content of the activities of youth organizations in this regard.

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STRATEGIES FOR MANAGING THE GENERAL SECONDARY EDUCATION SYSTEM

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ABSTRACT

This article provides information which is paid attention to the education system of the Republic of Uzbekistan and new reforms in the field of education management. In particular, the management system of general secondary education includes views on its composition and the responsibilities of its representatives, as well as on the experience of concrete and effective reforms to be implemented in this area. The measures taken in our country in the field of education until 2030 prove the importance of the future in the development of the country. New suggestions and comments were made on school management, which is the basis for the organization of the educational process.

KEYWORDS:*Manager, Education Management, Management System, Model Schools, MPE (Ministry Of Public Education), Education System Management Strategy, Reform, Education Quality, Teacher Training Institutes.*

INTRODUCTION

The main task of the education system is to provide our youth with in-depth knowledge in accordance with world educational standards, to educate them in the spirit of love for the Motherland, loyalty to the ideas of national independence. In turn, requires the heads of educational authorities, institutions and educational institutions to be organizers and entrepreneurs, highly educated and highly cultured.

It is well known that most secondary school principals are among the most hard-working public educators. At the same time, they face many challenges throughout their careers. There are, objective and subjective reasons for this situation. The main ones are:

- Poor knowledge of the theoretical foundations of education management;

- Inefficiency of school internal management;

- Failure to take into account the human factor in school management;

- Preservation of paperwork and command-based style;

- The division of labor between school leaders does not work well in practice;

- Neglect of professional development;

- Staff turnover;

- Inefficient use of time, etc.

The following are some of the key issues in school management that are key areas of governance. At the current stage of development of the secondary school, it is a difficult and responsible task to lead it. School internal control:

• It is a comprehensive study and analysis of the educational process in accordance with the goals set by the team.

• Regular, well-thought-out monitoring will help to identify and consolidate successes and prevent shortcomings in the work of the pedagogical team.

• School internal control disciplines teachers as well as school leaders. This work should be planned, regular, goal-oriented, complex, and cover all aspects of the educational process.

Improving and democratizing the management culture of managers in secondary schools is one of the important requirements of the modern market economy. It should be noted that in the current period of reforms, the management and administration of the economy is based on constitutional rules and scientific principles. Forms and methods of school management can change and improve at each stage of economic development of our republic in accordance with the tasks to be solved by society. However, at all stages of economic development of our republic, especially during the current reforms, the rules and content of public education management remain important. Therefore, proper organization of the school's internal manager is one of the most important requirements of our time. We consider it appropriate to pay special attention to these rules of governance.

In accordance with the decree of the President of the Republic of Uzbekistan dated September 30, 2017, the management system of the Ministry of Public Education has been improved, the main tasks and areas of activity have been identified. The President instructed to increase the salaries of teachers, their status in society, to provide them with social and legal support. It was emphasized that one should not be involved in activities that are not. The task is to create a special legal service to protect the rights of teachers. "The quality of general secondary education needs to be raised to a new level. State education standards and curricula need to be revised based on what children need to know in each classroom. There is a need to create and publish textbooks on the basis of the most modern methods, to strengthen the areas of technology, engineering, mathematics, art, foreign languages in schools, to re-equip laboratories in this area. It is also important to ensure integration with the pre-school and higher education systems,"saidShavkatMirziyoyev.

Review of the requirements for principals and deputy principals of secondary schools, the appointment of persons with real managerial skills to this position, the appointment of deputy directors for spiritual and educational work Special attention was paid to the financing of the public education system. It was noted that in the formation of the state budget for 2019 it is expedient to increase funding in this area, as well as to establish a special fund under the Ministry of Public Education to attract highly qualified specialists. In addition, the widespread introduction of information and communication technologies in the education system, the disposal of extra-budgetary income of schools, the establishment of a system of internal collective control in schools. The meeting focused on issues such as the development of school rankings in order to increase the number of model schools. In the Republic of Uzbekistan, the

education system is organized as a whole, and its form of government is centralized on the basis of commonality. The main basis of governance is the effective organization of education.

The education system of the Republic of Uzbekistan consists of:

• Governmental and non-governmental educational institutions implementing educational programs in accordance with state educational standards;

• Scientific and pedagogical organizations conducting research necessary for the functioning and development of the education system;

• Public administration bodies in the field of education, as well as enterprises, institutions and organizations under their management.

The education system of the Republic of Uzbekistan is unified and integrated.

Education in the Republic of Uzbekistan is carried out in the following forms:

• Preschool education;

• General secondary education;

• Out-of-school education;

• Secondary special vocational education;

• Higher education;

• Postgraduate education;

•teacher training and retraining.

Education authorities

The general management of the education system is carried out by the Cabinet of Ministers. The Cabinet of Ministers also directly manages the branches of a separate higher education institution, Tashkent Islamic University and internationally renowned foreign universities (MSU, Westminster University, etc.).

The powers of the Cabinet of Ministers of the Republic of Uzbekistan include:

• Pursuing a unified state policy in the field of education;

• Management of public education authorities;

• Development and implementation of educational development programs;

• Establishing procedures for the creation, reorganization and liquidation of educational institutions;

• Establishment of procedures for accreditation of educational institutions, certification of pedagogical and scientific personnel;

• Issuance of permits to educational institutions of other countries for the right to provide education in the territory of the Republic of Uzbekistan;

• Establishing and enforcing the procedure for recognizing foreign educational documents in accordance with the law;

• Establishment of state educational standards;

• Establishment of state educational documents and the order of their issuance;

• Determining the procedure for admission to educational institutions and the amount of state grants;

• Appointment of rectors of state higher education institutions;

• Establishing the procedure for transferring students from one accredited educational institution to another;

• Other powers provided by law.

The direct management of the education system in Uzbekistan is carried out by two ministries - the Ministry of Public Education (MPE) and the Ministry of Higher and Secondary Special Education (MHSSE).

MPE is responsible for the activities of preschool, out-of-school institutions and general education schools. MPE manages 5 higher education institutions and 16 teacher training institutes. The Ministry has regional, district and city departments of public education, which methodologically manage the activities of relevant educational institutions on the ground.

Sturucture of the Ministry of Public Education

- preschool education;
- general secondary education;
- District MPE
- Regional MPE
- City MPE
- out-of-school education;
- higher education;

Ministry of High and Vocational Education of Uzbekistan is the governing body of higher and secondary vocational education in the country.

The Ministry is accountable to the Cabinet of Ministers of the Republic of Uzbekistan.

- ❖ The system of the Ministry includes the Center for Secondary Special and Vocational Education,
- ❖ The Center for Higher and Secondary Special Education,
- ❖ The Center for Vocational Education Development and departmental universities.

Measures to improve the management system in education

Establishing priorities for the systemic reform of higher education in the Republic of Uzbekistan, raising the process of training highly qualified personnel with modern knowledge and high moral and ethical qualities to a qualitatively new level, modernization of higher education , in order to develop the social sphere and the economy based on advanced educational technologies:

The concept of development of the higher education system of the Republic of Uzbekistan until 2030 has been created. According to it, the "Roadmap" for the implementation of the concept of development of the higher education system of the Republic of Uzbekistan until 2030 in 2019 has been developed. The Concept of Development of the Higher Education System of the Republic of Uzbekistan until 2030 (hereinafter - the Concept) Ensuring strong integration of science, education and industry based on the needs of the social sphere and the economy In order to improve the quality of education, training of competitive personnel, effective organization of scientific and innovative activities, development of international cooperation, as well as the

President of the Republic of Uzbekistan dated July 11, 2019 No PP-4391 "On measures to introduce new principles of governance in the education system."

The concept defines the strategic goals, priorities, objectives, medium and long-term stages of development of higher education in the Republic of Uzbekistan and serves as a basis for the development of programs and comprehensive measures in this area.

School management is also strategized on the basis of the above-mentioned structure, that is, it is carried out in a well-defined, clear plan and direction. A school charter has also been developed, which includes the following rules.

School management is based on the principles of democracy, transparency and self-government. The school community works closely with parents, neighborhood committees, and the general public.

The school pedagogical council is the highest governing body of the school. The school principal is the chairman of the pedagogical council.

The pedagogical, methodical, guardianship councils and the parents' committee of the school are formed and function on the basis of the relevant Regulations approved in accordance with the orders of the Ministry of Public Education.

The school principal is directly in charge of the school's educational process and day-to-day operations. School principal:

The school director directly supervises the educational process and the day-to-day activities of the school, organizes the educational (educational) work in the school, provides the administrative-economic (production), financial work of the school, creates a procedure for compliance with safety standards and regulations in the school.

The school principal shall be appointed and dismissed by the head of the relevant public education department upon the recommendation of the head of the city public education department. The school principal reports directly to the head of the city's IEP. The Deputy Director for Educational Affairs, in cooperation with the school principal, organizes the educational process in the school, provides methodological guidance to the school teaching staff, ensures compliance with safety standards and regulations in the educational process. provides, reports on educational work and organizes work on general compulsory education.

The Deputy Principal for Academic Affairs reports directly to the school principal.

Directly to the Deputy Principal for Academic Affairs

1) Teachers; 2) students; 3) Laboratory staff.

The Deputy Principal for Academic Affairs shall, within the scope of his / her authority, perform the following duties:

The activities of the teaching staff include daily and future planning. Coordinates the implementation of curricula and programs for teachers and other educators. Organizes and coordinates the development of the necessary teaching materials. Regularly monitors the quality of the educational process and the objective assessment of the results of educational training of students, the work of clubs and electives; The school attends classes and other types of classes conducted by teachers (at least 180 hours during the school year), analyzes their form and content, informs teachers of the results of the analysis. and conduct their work. Organizes educational work for parents, receives parents (substitutes) on the organization of the educational process. The educator assists the staff in mastering and developing new (innovative) programs and pedagogical technologies; compiles schedules of classes and other types of educational activities, ensures quality and timely replacement of classes of temporarily absent teachers,

missed and replaced by another teacher keeps a log of lessons. Ensures the timely preparation of prescribed reporting documents, monitors the correctness and timeliness of class journals and other documents by teachers.

The educator participates in the selection and placement of staff, organizes work to improve their skills and professionalism; supervises the work of methodological associations, improves their skills. Participates in the preparation and conduct of certification of teachers and other staff of the school; maintains, signs and submits to the school principal the timesheet of teachers and teaching staff. Organizes timely and quality certification of classrooms, workshops, gym and ancillary rooms with the participation of the Deputy Director for Administrative and Economic Affairs. Instructions on labor protection as well as the development of safety sections in the guidelines for practical and laboratory work and periodically reviewed at least once every 5 years. Deputy Director for Educational Affairs in collaboration with determines the methodology and procedure for teaching traffic, water and street behavior, fire safety rules, conducts testing of students' knowledge. Carries out administrative-collective control over the safety of use and storage of teaching aids and equipment, chemical reagents, visual aids, school furniture in cooperation with the trade union committee. Takes timely measures to remove artificial chemical reagents, training equipment and tools not provided for in the standard lists, including those installed in workshops, classrooms and other rooms without the appropriate permit, etc. suspends the educational process in the event of dangerous conditions for the health of staff and students in the rooms of the educational institution. At school, in life, in public places, teachers adhere to ethical norms that are appropriate to their place in society.

Deputy Director for Spiritual and Educational Affairs:

The Deputy Director for Spiritual and Educational Affairs shall be appointed and removed from office by the Head of the City Department of Public Education upon the recommendation of the Director.

The deputy director of the school for spiritual and educational work organizes out-of-class and out-of-school educational work with students, provides general methodological guidance on the educational process, conducts specific activities with students and ensures compliance with safety standards and regulations in extracurricular activities, provides guidance in collaboration with the neighborhood committee and other out-of-school organizations.

In conclusion, an educational quality of an institution is a graduater, not an educational service. The starting point for the formation of a quality management system should be the construction of a “model” of the graduaters of the educational process, which should be a combination of personal professional qualities that should be focused on the educational process: its content, teaching methods, forms of organization, methods of assessing and evaluating students' knowledge. However, it should be noted that the learning process is the foundation of the educational organization. At the same time, it cannot be separated from other types of activity: scientific, educational, methodological, and administrative.

Competitive personnel will be developed according to followed stricted accurate rules of the establishment. The organization of school management should be based on the full motivation of teachers, as well as the adoption of a disciplinary charter by each school, its transformation into a law of the school, and the exchange of views with parents on these rules in the educational process. - Working with mothers makes the educational institution a more effective management institution.

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AN OVERVIEW ON IOT TECHNOLOGY

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ABSTRACT

The use of conventional Internet protocols for living thing or thing-to-thing interaction in embedded networks is a straightforward interpretation of the phrase Internet of Things. The primary goal of the Internet of Things is to build a virtual footprint of all connected devices and people. It establishes a new means of communication between all things and humans, as well as between objects themselves. IoT allows us a new degree of connectivity. This article summarizes all of the IoT ideas and mechanisms. RFID systems, sensor networks, or intelligence technologies are all key technologies that allow IoT. The possible uses of these technologies are discussed, as well as the main research problems.

KEYWORDS:*IOT Technology,Internet RFID, Wireless.*

INTRODUCTION

In the area of wireless communication, a new paradigm known as "The Internet Of Things (IoT)" was developed many years ago. Kevin Ashton created this phrase in his demo in the year, and its significance has grown steadily since then. Incorporating Internet of Things (IoT) into embedded mobile transceivers in a broad variety of products would take information and communication technologies to a whole new level. The Internet of Things (IoT) is a critical component in corporate change. The concept of the Internet of Things was examined during the 20th Tyrrhenian workshop on digital communications. The Internet of Things (IoT) is defined as a network of different “things” or “objects” around us, such as sensors, mobile phones, and Radio Frequency Identification (RFID) tags that interact with one another and effectively perform their duties using a unique addressing system. To comprehend the Internet of Things, we must first comprehend the function of RFID technologies (used to identify or communicate with other devices).

Wireless Sensor Networks (which compose information gathering, processing, and transformation), intelligent technologies (to solve issues and initiate and regulate machine-to-machine interaction), and Nano-meter technologies are the mainstays of the Internet of Things

(to construct small devices in order to socialize the IOT applications). In the area of IoT, research is continually being done in order to make it more user-friendly and to improve the security of the data transmitted via it. In Japan, the Unique Identifier (UID) is the best architecture, as well as the EPC worldwide networks provided by Auto-Id labs are the finest in the sector. The primary goal of these organizations is toaims to create a system that uses RFID tags and wireless communications to link every item on a global platform known as the "Internet." The Electronic Products Code (EPC) is a unique identifier that is regulated by the RFID technology. In 2009, Palmisano, the CEO of IBM, presented an idea dubbed“Smart Planet” by incorporating sensors into all objects and other systems such as railroads, electricity grids, and other devices that interact with one another and other gadgets.clever architectural design The concept of "Sensing China" was first proposed in 2009[1].

In Wuxi, Jiangsu Province, a hub for sensor networks was established, which is a major supplier of science and technology patents in the country. The overall concept is11.1 billion RMB is a rough estimate. Other big nations have also begun research in this area in order to build stronger IoT infrastructure.IoT has been represented or defined from a variety of viewpoints, and as a result, IoT is explained in a variety of ways. The two terms "Internet" and "Things" are the primary reason for all of these different meanings. The term "internet" refers to a collection of networks and entities that are mostly made up of generic items.When you mix the terms Internet and Things; you get a whole new level of progress in the world of ICT. The phrase Internet of Things (IoT) refers to a global network of linked things with a unique EPC, or address. The most perplexing job in this system is identifying and storing the items that have been traded.information. As a result, a new notion of semantic viewpoint emerges in the IoT.CASAGARAS consortium presented an advanced method that is much superior than RFID's approach. The consortium's primary goals are twofold[2], [3].

- It supports IoT globalization, which allows us to link the virtual and physical worlds.
- Assists with current and future internet and network advancements.

Layer at the edge:

Embedded system, sensor networks, as well as other types of hardware are included in this hardware layer. The main data sensors that have been installed are among them. RFID tags, sensor networks, or embedded edge processors are all provided by these hardware components.

Layer of The Access Gateway:

This is where the initial stage of data handling takes place. It can conduct cross-platform communications as well as message routing, publishing, including subscribing.

Layer of middleware:

In bidirectional mode, this is the most important layer. It serves as a link between the hardware layer and the application layer at the top of the stack. It is in charge of essential tasks including device and information management, as well as data filtering, data aggregation, sentiment analysis, security systems, including information discovery.as well as the EPC (Electronic Product Code) information service and the ONS (Office of National Statistics) (Object Naming Service).

Application layer:

sits at the top of the stack and is in charge of delivering various IoT apps to diverse consumers. Manufacturing, logistics, retail, environment, public safety, healthcare, food and medicine, and other industry verticals may all have uses. With the maturation of RFID technology, a slew of new applications is emerging.will fall under the IoT umbrella.

Applications:

IoT allows items in our daily working or living environments to interact and comment on data gathered from their surroundings, allowing for a wide range of applications. IoT applications that are either immediately relevant or closer to our present living environments are divided into three areas.

Management of the Supply Chain:

In the Internet of Things, real-time information processing technology based on RFID and NFC is utilized. We can correctly overlook and handle real-time data, work-in-progress, and in-progress data.It is possible to acquire transit phases with accurate due dates. This would result in a more accurate prediction and an increase in the forecast. Out-of-stock items are automatically replenished, andInventory decrease might be feasible. It would just take a few days to implement these technologies, and they would operate with no safety stock. Transportation Automobiles, buses, and trainsSensors, actuators, and processing power will become increasingly common in taxis and road junctions. To actualize traffic, important data may be gathered.oversight and advice, assistance with depot management, and providing visitors with accurate transit information One of the most significant IoT applications is theTIG (Traffic Information Grid) is a traffic information grid that is deployed on the Shanghai Grid[4].

Disaster Preparedness and Response:

Natural catastrophes and unintentional disasters have become more common in recent years. RFID and WSN technologies play a critical role in predicting disasters and assisting with recovery when they occur. Residents in the surrounding region would have more time to prepare if they had timely access to pertinent information about dangerous environmental conditions.Prepare measures to mitigate the damage and reduce the number of victims as a result of the incident. WSN allows for the collection, processing, and transfer of data.Environmental data from the point of genesis of catastrophes to cities that may be in jeopardy. Authorities may then utilize this information to quickly evaluate urgent situations and arrange resources.

Unresolved Problems:

Standardization:

Despite significant efforts by scientific communities, European Standards Organizations (ETSI, CENELEC, CEN, etc.), Standardization Institutions (ISO, ITU), and global Interest Groups and Alliances (IETF, EPC global, etc.) to standardize the IoT paradigm, they are not integrated in a comprehensive framework. Efforts to standardize have centred on three main areas: RFID frequency, communication protocols between readers and tags, and data formats utilized on tags and labels. Major standardization organizations working with RFID technology include EPC Global, the European Commission, and ISO. The primary goal of EPC worldwide is to promote the global adoption of an EPC for each tag as well as associated industry-driven standards. The European Commission has made concerted efforts to define RFID technology and facilitate the transition from localized to global deployment.RFID uses for the Internet of Things ISO, on the other hand, is concerned with how to modulate, use frequencies, and avoid collisions from a technical standpoint[5].

Which is more important, policy or security?

Authentication or data integrity is the most important aspect of security. Due to a lack of suitable infrastructure and servers to send data between nodes, authentication is particularly difficult in IoT scenarios. Furthermore, objects have less resource to do complex calculations than PCs, PDAs, cell phones, and other devices. There have been a few proposals for authentication techniques, however they all have significant faults and are useless against man-in-the-middle

attacks. For data integrity solutions to function, an opponent must be present. It's difficult to change data in transactions without causing the system to malfunction. In the traditional information sector, the problem of data integrity has gotten a lot of attention. When RFID systems or sensor network are connected to the Internet, a new problem will arise. Sensor nodes or RFID tags are distributed over a wide area and spend most of their time there.Adversaries may tamper with data while it is being stored in the node or traveling across the network. Memory is encrypted to protect data from the first kind of attack. The bulk of tag technology solutions for sensor networks have been described[6].

Within the IoT technology stack, connectivity options are available

There are as many potential real-world uses of IOT. as there are connection methods to support them. Each communications method may provide various service enablement possibilities depending on the requirements of a particular IoT use case, with trade-offs between battery consumption, range, and bandwidth. If you're constructing a smart home, for example, you may want to connect your interior temperature sensors and heating controller with your smartphone so that you can remotely monitor and change the temperatures in each room based on your current requirements. The IP-based IPv6 networking protocol Thread, which was developed specifically for home automation environments, would be the preferred option in this situation.

With such a wide range of communication standards and protocols, one may wonder why new solutions are needed when there are already well-proven Internet protocols have been in use for decades. The reason for this is that current Internet protocols, including such Transmission Control Protocol/Internet Protocol (TCP/IP), are often ineffective and power-hungry, making them unsuitable for use in developing IoT technology applications. This section will provide a quick review of the most popular alternative Internet protocols designed specifically for IoT devices.

Governance:

In the IoT ecosystem, like in the current Internet, issues of "thin" legitimacy and a lack of adequate openness and accountability emerge. Because the Internet of Things (IoT) is more than just a buzzword, The Internet Governance ideas are no longer appropriate to be applied uniformly, since they are not an extension of today's Internet, but rather a networking of separate yet compatible systems.applied. Learning from Internet censorship, the idea of "multi-stakeholder governance" should be seen as the new way forward in favor of the participation of all stakeholders.the whole society Such a change calls into question the conventional notion of legitimacy and necessitates addressing the broad issue of who may be considered legitimate.

Because IoT technology has already established itself in our homes, public places, offices, and factories, and because of its rapid growth, the overused IoT slogan "everything that can be linked will be connected" seems to be getting closer to being our everyday reality. As a result, the important issue isn't when this will happen, but how the connections will be established to achieve maximum efficiency while maintaining essential characteristics like security and cost-effectiveness. With this in mind, a deployment including a large number of low-power, low-bandwidth devices would need the adoption of LwM2M, a lightweight protocol developed specifically for managing machines with limited resources. As a result, from a practical standpoint, the issue of success in the case of specific IoT applications seems to come down to selecting the right IoT technology from the wide variety of available options.

LITERATURE REVIEW

Zhang et al studied about The Narrowband Internet of Things (NB-IoT) is a new 3GPP radio interface standard intended for low-power wide-area networks (LPWANs). It can offer great coverage (20dB better than GPRS), low device power consumption (up to 10 years of battery

life), low delay sensitivity, huge capacity, and ultralow device cost. NB-IoT is thought to offer a lot of promise for Internet of Things (IoT) applications including smart meters, intelligent parking, precision farming, industrial automation, logistics pallet tracking, and intelligent buildings. There has been study into many elements of NB-IoT technology, but much of it has been focused on theoretical as well as simulated analyses, with little connection to an actual NB-IoT network. China Telecom, China Unicom, or China Mobile have been doing pre-standard NB-IoT technology trial work in certain regions since 2016. An in-depth performance assessment of NB-IoT in a real-world indoor setting is presented in this article. This research looked at whether the existing NB-IoT network can support connected devices and meet the needs of IoT applications in an indoor setting. Meanwhile, it looked at the network's limitations based on existing NB-IoT technology, particularly in terms of latency and packet delivery sizes[7].

Pinka et al. investigated the Internet of Things (IoT), which is now one of the most popular technologies. By 2020, it is predicted that there will be 50 billion Internet-connected gadgets. Smart cities and smart homes, for example, depend heavily on IoT phenomena, which use a broad range of sensors for data gathering, analysis, and subsequent actions. The article explains how Riga Technical University uses this cutting-edge and relatively new technology for instructional reasons[8].

Ahemd et al studied about the Internet of Things (IoT) has been a major breakthrough in Information and Communication Technology. Over 50 billion gadgets are expected to be connected to the Internet of Things in the next several years. The IoT network's security should be a top concern. From 2010 to 2016, we evaluated the security issues in the four levels of the IoT architecture, as well as the solutions offered. In addition, key security technologies such as encryption are examined in the context of the Internet of Things. Finally, we address security attack remedies on various levels of the IoT architecture, as well as future research areas within the IoT architecture[9].

Al Hogail et al. conducted research on the According to studies, trust plays an important part in consumers' decisions to embrace Internet of Things (IoT) technologies or services since it helps them overcome risk and ambiguity associated with them and increases their degree of acceptance and adoption intention. Nonetheless, research on the behavioral component that explain consumers' perceptions of IoT adoption are still lacking in the IoT literature, which focuses more on the technical side. The primary aim of this research is to look at the variables that affect customer trust and their impact on IoT adoption. A conceptual trust model has been developed that covers the main variables influencing trust in IoT technology adoption. Product-related factors, societal interference factors, and security-related factors are the three categories of variables that we believe will affect the degree of confidence in the model. This paradigm is verified by polling consumers' thoughts, which offer perspectives and comments on the variables that influence their confidence in technology. The model may help researchers dig deeper into the trust problems and build a reliable body of knowledge to drive IoT product development or marketing strategies that are tailored to the needs of consumers[10].

DISCUSSION

Many years ago, the "Internet of Things (IoT)" was created. This term was coined by Kevin Ashton in his presentation last year, and its importance has risen gradually since then. Incorporating Internet of Things (IoT) into integrated mobile transceivers in a wide range of goods will elevate information or communication technology to new heights. The Internet of Things (IoT) is an important part of business transformation. A simple meaning of the term Internet of Things is the use of traditional Internet technologies for living thing or thing-to-thing interaction in embedded networks. The Internet of Things' main aim is to create a virtual

footprint of all connected people or devices. It creates a new communication channel between all things and people, as well as between items themselves. The Internet of Things provides us with a new level of connection. This research, on the other hand, takes a comprehensive look at the topic. Technologies that are appropriate It is anticipated that, for the not future, the aim of achieving "Everyone will now be able to connect from anywhere and at any time. Anything is possible "should depend on cross-discipline or team members Previous work in comparable areas should be used as a starting point as a consequence, architectural guidelines must be adhered to. It was designed and launched in a global legal environment. Representation has a legitimizing effect only if the outcome is genuine. Reflects the value of the parties represented This concept, in addition to being equal, requires bargaining power and fair processes. Governance of the Internet of Things: Transparency, accountability, as well as public involvement in decision-making.

CONCLUSION

The state-of-the-art on the Internet of Things in this article, which covers a variety of definitions, enabling technologies, and various applications, as well as open research problems and initiatives.This study, on the other hand, offers a thorough examination of the subject. Technologies that are relevant It is expected that in the not-too-distant future, the realization of the goal of "from anywhere and at any time will now have access to connection for everyone. Anything "should rely on cross-discipline and collaborative efforts Previous work in similar areas as a result, architectural standards must be followed. Created and produced under a legal context that is worldwide. Only if the result is legitimate has representation a legitimizing impact. Represents the value of the represented stakeholders Aside from being equal, This idea requires negotiating strength and fair procedures.Transparency, accountability, and public participation in decision-makingGovernance of the Internet of Things.

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A NON-SUBMERGED WAVE KINETIC ENERGY CONVERSION SYSTEM: REVIEW

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ABSTRACT

Green wave energy is abundant in the seas and it is currently being utilized to produce power on a large scale. It may also be used to power a single beacon, buoy, or underwater vehicle. A wave energy converter (WEC) device is a kind of wave energy harvesting device that transforms the kinetic energy of waves into electrical energy. Its primary feature is mobility, and it can be directly built on different types of power supply equipment, with promising development possibilities. A floating type WEC is described in this article. With the assistance of a permanent magnet and an induction coil, this suggested device transforms the mechanical energy of the wave into electrical energy. The suggested technology is based on the electromagnetic induction concept (EMI). This method uses ferrofluids to decrease the damping of the magnets' motion while also amplifying the magnetic field. This system does not depend on hydraulics for energy conversion and can simply be moored to another offshore wind energy asset or to itself. The asset will be able to run 24 hours a day, seven days a week, reducing intermittency and ensuring consistent production all year. Despite the fact that previous study in this area has been conducted, there is a critical need for additional research in this field in the future.

KEYWORDS:*Energy Conversion, Electromagnetic Induction, Magnet, Wave, Wec.*

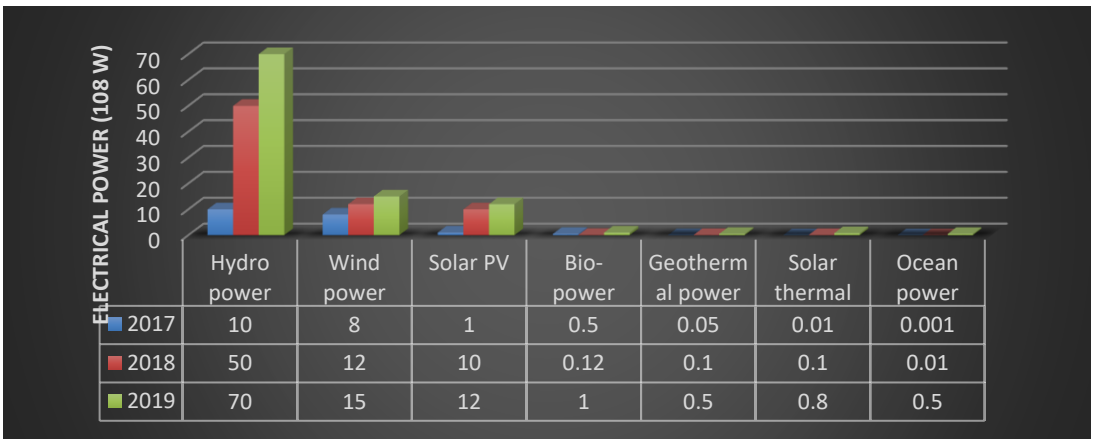
1. INTRODUCTION

The demand for electrical energy is exploding as a result of technology advances and an ever-increasing human population. Electrical power producing capacity must be expanded on a worldwide scale to meet the growing demand for energy. Currently, the majority of electricity generators depend heavily on fossil fuels. It is a reality that non-renewable energy sources such as coal, petroleum, and gasoline are depleting at an alarming pace. Carbon dioxide and other greenhouse gases are emitted by these sources, which are detrimental to the environment. According to projected findings, the average temperature of the earth's surface would increase by

1.4-5.8 degrees Celsius by the end of the century. Furthermore, based on previous decades, the warming rate is projected to be 0.02 0C each year. Solar, wind, hydropower, biomass, and geothermal energy are examples of renewable energy sources (RES) that may be utilized as a substitute for conventional fuels since they are readily accessible and do little to no environmental damage[1]. Figure 1 show the power generation from RESs.

Mechanical movement is created by oceanic waves in wave energy collecting systems. Waves are unpredictable in nature, which has an impact on wave energy devices. There are no rotating motions in the random mechanical movements. The random motion may be transformed into steady rotating movement with the help of auxiliary devices. However, the auxiliary devices are subjected to a more thorough examination due to their monetary cost, energy waste, and complicated upkeep. As a result, conventional wave energy harvesting systems are ineffective. To transform mechanical motions into electrical energy, a specific kind of equipment is needed in addition to the generator. The vast majority of these generators are linear generators (LGs) that work on the electromagnetic induction principle. For this aim, small-scale piezoelectric and triboelectric generators have recently been tried. Ocean wave energy (OWE) energy extraction is still in its early stages, and more study is needed before it can compete with wind and solar power facilities[3].

With the assistance of electromagnetic induction, the suggested method uses mechanical vibration of the wave to produce energy. Electrical energy may be effectively produced using vibrational energy. Vibrations are regarded unneeded in most areas, despite the fact that there are numerous sectors in which this kind of energy has been used in a more beneficial way. The fundamental concept of electromagnetic induction is used to accomplish this. Spring serves as a source of energy. When there are external factors present, such as ocean wave movement, vibrations are generated. The spring vibrates and expands or compresses, causing electric flux to be produced. Electromagnetic induction occurs as a consequence, resulting in electric voltage. The spring's mechanical strength is such that it does not break or collapse throughout the whole operating duration, even oscillating for long periods of time. It's also designed to be very sensitive to tiny vibrations. Vibration amplification springs are the name for these types of springs. They have sympathetic vibrations that are responsive to external oscillations. The vibration amplification spring is used to surround a magnet and move it in an upward and downward motion with great precision. As a consequence, electromagnetic induction occurs, resulting in electricity. This is the vibration power generating mechanism that is utilized in wave energy conversion (WEC)[4].



	Hydro power	Wind power	Solar PV	Bio-power	Geothermal power	Solar thermal	Ocean power
2017	10	8	1	0.5	0.05	0.01	0.001
2018	50	12	10	0.12	0.1	0.1	0.01
2019	70	15	12	1	0.5	0.8	0.5

Figure 1: Illustrates the electric power generating capacity using different RESs[2]**.**

The proposed system converts wave mechanical energy from the ocean or any big water body into electrical energy by cascading WECs in series and parallel configurations. This WEC may also be used on any surface that generates continuous oscillatory/vibratory motion to generate an electric current that can then be converted to alternating current (AC) or direct current (DC) as needed depending on the experiment. The suggested system works on the concept of electromagnetic induction (EMI). Permanent magnets and an induction coil are used in the proposed system. EMF is induced in the coil by the motion of the permanent magnet produced by the wave. Ferrofluids are used in this system to decrease the damping of the magnet's motion and to amplify the magnetic field. This method produces continuous energy while using wave energy, addressing the intermittency issues that solar and wind power production systems have. The suggested system is a floating generating system that does not pollute the marine environment, thereby eliminating the disadvantages of existing marine power production systems [5].

2. LITTERATURE REVIEW

Faizal et al. discussed floating point absorber wave energy converter.Various wave energy conversion systems utilize different methods to convert wave energy to useable energy. Because of the changing incident waves, the generator's power output will fluctuate. The interaction between the wave structure and the incident waves causes changes in the incident waves, which affects the power output. The gadget must be sufficiently stable to avoid capsizing. When the incident wave frequencies match the device's inherent frequency, the point absorber will function at its best. Although the techniques for determining natural frequencies for pitching and heaving systems are given, this system is a fixed type with a more complicated power take-off [6].

Zhongyue et al. discussed a new adaptive reversing wave energy generating device that belongs to micro-sized wave energy generating device. The low speed and huge torque wave energy may be transformed into electric energy, which can be utilized for load and lithium battery charging, using the upper and lower absorber blade groups. For the features of the wave energy producing device, a finite element analysis of the blades is performed, and the experimental platform is constructed and validated via tests. The real output voltage curve of the wave energy producing device is produced based on the wave condition of 150mm wave height in various periods. The output voltage oscillates periodically due to the device's periodic oscillation. The output voltage fluctuates by two times in one period of device movement. There will be a period when the blades are not spinning between the device's upward and downward oscillations, and the output value on the voltage value will be 0. The water resistance of the blade, as well as the torque of the generator, contributes to this. To ameliorate this condition, it may raise the wave speed relative to the blade, or add quality to the outer wheel to increase the rotation inertia, and guarantee a sustainable blade rotation and a continuous power production process under the action of inertial force [7].

Matt et al. discussed the Oscillating Wave Surge Converter (OWSC) as a novel shoreline or near-shore WEC. A study of the performance of the shoreline oscillating water column led to the development of the idea. The OWSC is designed to tightly link with horizontal particle motion, allowing high amplitudes of working surface motion while reducing energy losses in related water particle movements. A potential shoreline and near-shore WEC is the Oscillating Wave Surge Converter. The tank testing that has been done so far has not been extensive, but it has been enough to show that the OWSC is more productive than an ocean wave converter (OWC) on the beach and Pendular. Furthermore, the OWSC should have lower construction costs than both a shoreline OWC and a Pendular, leading in a cheaper cost per unit of supplied energy, i.e. pence/kWh. In addition, many different OWSC implementations have been discovered, each with its own set of benefits and drawbacks[8].

Myin et al. discussed a Cross-flow turbine that will generate 100 kW output power from a head of 28 m and a flow rate of 0.5 m^3 /s. The rotating speed is 600 rpm, the specific speed is 95.39, the runner diameter is 340 mm, and the runner width is 416 mm for these heads and capacity. The runner's precise design drawings are also well shown in this article. Furthermore, the diameter and breadth of the runner are shown with different flow rate ranges of 0.2 to 1 m3 /s and head ranges of 10 to 50 m. As a result, selecting the appropriate runner's dimensions based on the matching head and flow rate is simple. The Cross-flow turbine is utilized in rural regions and places that are distant from the grid system for high demand energy. It may be utilized for low and medium head water using basic technology that can be developed and constructed locally using mostly local resources at a cheap cost utilizing simple technology[9].

3. ENERGY HARNESSING SYSTEM

An energy harvesting system consists of a module that floats on the surface of a wave-producing body and captures and transforms wave energy into electrical energy. To transform wave energy into electricity, the technique primarily depends on electromagnetic induction. The basic unit's output is a low-powered alternating current (AC) that is converted to direct current (DC). DC-DC converters will be used to smooth out the erratic DC current and convert it to a constant DC output, which can subsequently be converted to AC current using inverters.Figure 3 illustrates the schematic diagram of a single unit of the converter.

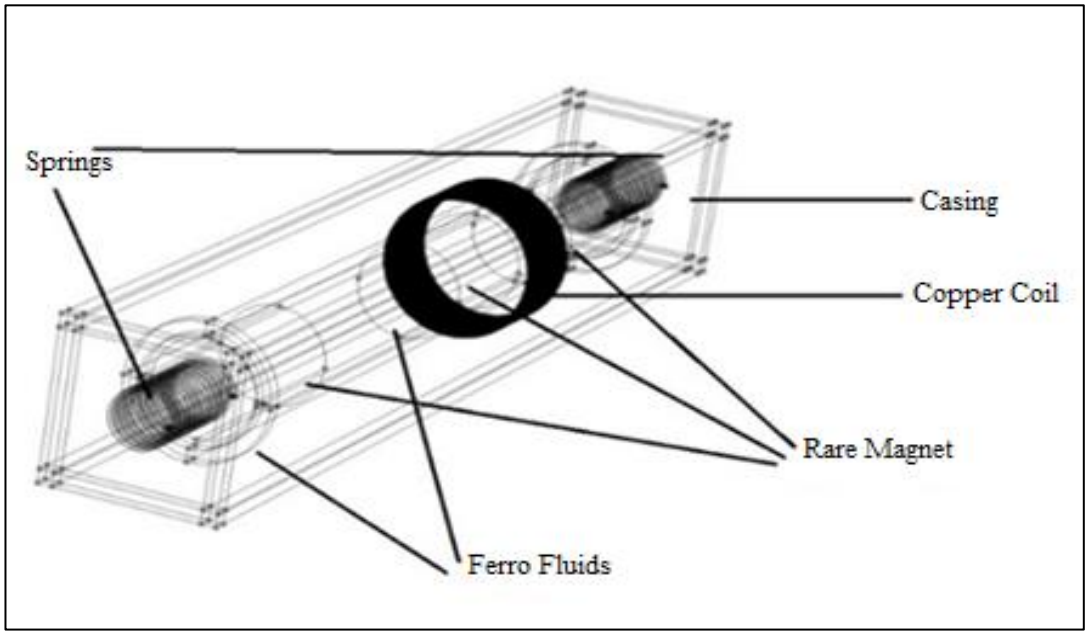


Figure2: Illustrates the schematic diagram floating energy harnessing module which generates EMF[10]**.**

Multiple units can be stacked together in series and parallel combinations to produce an output of 200W-400W unit that will have an approximate dimension of 30 in 30 in 10 in to make up a floating unit that can then be stacked to produce the utility-scale power output. This single unit has a power rating of 0.6-2 W.

3.1. Construction:

WEC is made up of a basic unit that is housed in the case shown in Figure 3. The casing should be non-magnetic and constructed of recyclable polymers if possible. Two springs, S1 and S2, are connected to the fixed hooks FH1 and FH2, which are part of the outer shell or encasing, in the basic unit. A glass closed tube is connected on both sides to springs S1 and S2 at hooks H1 and

H2, respectively. M1, M2, and M3 are the three magnets in the tube. At H1 and H2, M1 and M3 are secured and connected to the tube's closing two ends, respectively. Ferrofluids and M2 are free-moving components in the vacuum tube. Induction coils are wrapped around the tube to capture the relative motion of the magnet M2 and produce energy via electromagnetic induction. Depending on the length of the tube and the amplitude of the wave, there may be several coils. The basic unit's output is low-powered AC, which will be converted to DC.

3.2. Working:

The Electromagnetic Induction (EMI)concept is used by WEC. When the magnetic field of the moving magnet cuts the stationary coil, an EMF is generated in the system. Water waves cause vibrations on the exterior body generators. The moveable magnet in the tube, which is connected to the outer body through springs, moves as a consequence of these vibrations. The ferrofluids in the tube assist to reduce motion damping and improve the model's efficiency. A liquid that is drawn to the poles of a magnet is known as ferrofluid. It is a colloidal liquid composed of ferromagnetic particles dispersed in a carrier fluid, most often water. To prevent clumping, each magnetic particle is fully covered with a chemical agent capable of lowering the surface tension of the liquid in which it is dissolved. The basic unit's output is a low-powered AC signal that will be converted to DC.The block diagram of the working of the WEC is shown in Fig. 5.

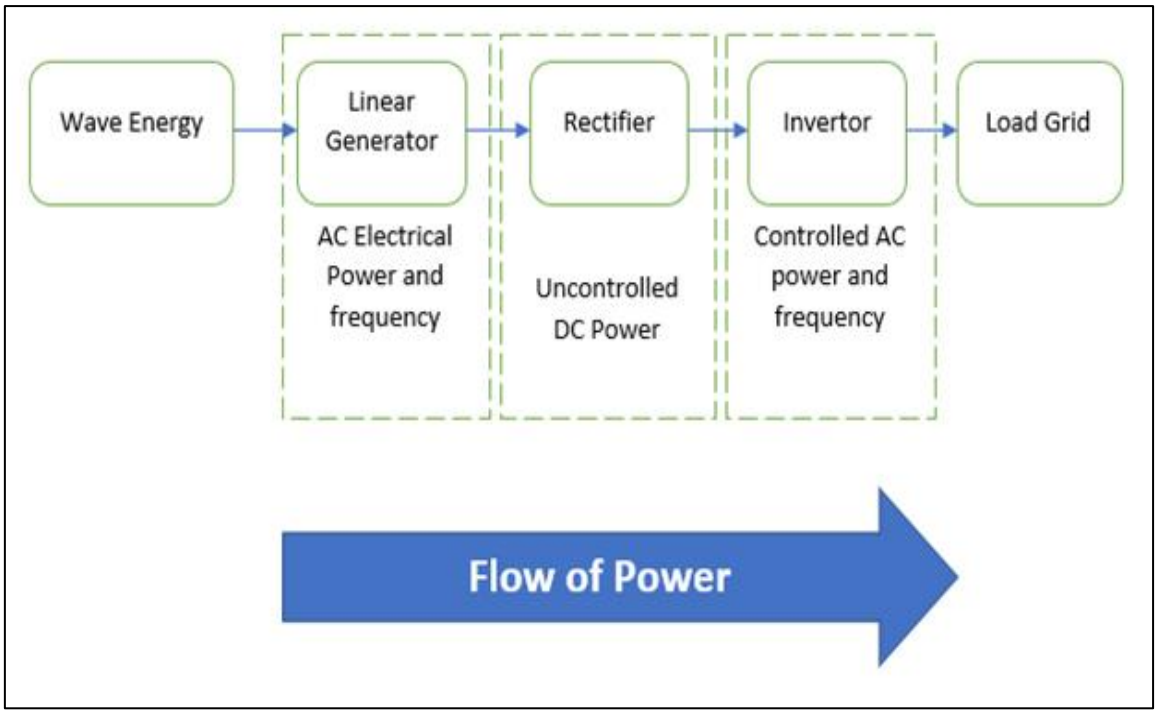


Figure3: Illustrates the block diagram of the power flow of the WEC.

4. DISCUSSION

The kinetic energy of the wave may be converted into electrical energy using this method. Due to the waves in the water, the floating body travels up and down, and the connected spring causes the magnet to move. A magnetic field crosses the coil as the moveable magnet passes across it, inducing an EMF and generating a current in the coil. Figure 4 shows the PMLG's output power for various wave qualities. The measured output power at various wave height and wave period values is displayed in this diagram. The output power rises as the wave height or period increases, according to the results.

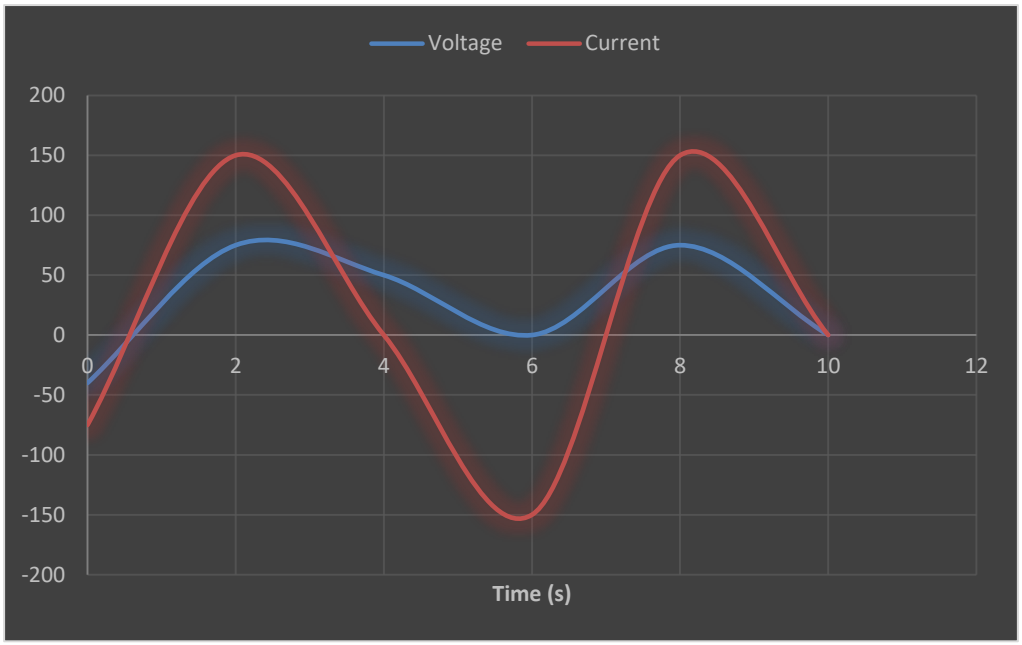


Figure 4: Illustrate the waveform of the output phase voltage and phase current of the floating wave energy conversion device[2]**.**

This WEC allows for the direct conversion of mechanical energy to electrical energy. Figure 4 shows a variable frequency and amplitude waveform that must be rectified before being converted into a sinusoidal fixed voltage and frequency waveform utilizing power electronics for grid connection. Passive or active correction is possible. A simple diode bridge may be used as a passive rectifier, and this has a power factor of one.

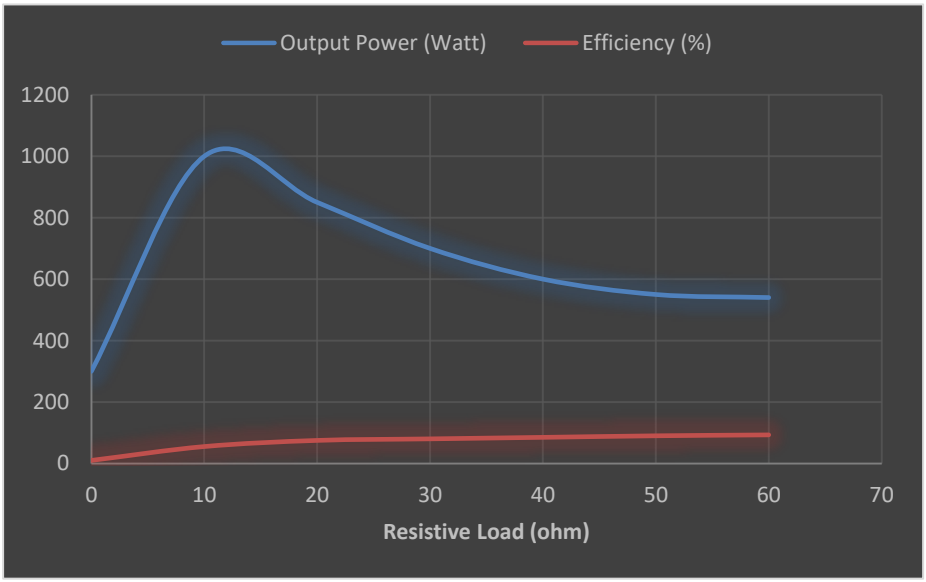


Figure 5: Illustrates the output power and the efficiency of PMLG on different resistive loads[2]**.**

Figure 5 depicts the PMLG's characteristics under various external load resistances. It can be observed that when the resistance rises, the output power increases first. When the load resistance reaches a particular level, the output power begins to drop. The PMLG's efficiency, on the other hand, improves as the load rises. The gradient of the increase, however, begins to diminish at a certain point, and the efficiency begins to stabilize.Wave energy may be extracted

using a number of techniques. Different devices and systems collect wave energy using different ways and convert it to electricity using different methods. Wave energy converters are categorized based on where they're used, how they get their power, and what kind of wave energy conversion technology they use. WECs may be divided into three categories depending on where they are placed in the ocean: shoreline, nearshore, and offshore. Shoreline WECs are placed along the water's edge. They offer the benefits of being simple to install and maintain, as well as not requiring anchoring or lengthy lengths of underwater electrical lines. Shoreline devices, on the other hand, would not be subjected to as strong waves as those found nearshore and offshore. The transitional zone between deep and shallow water may be described as the nearshore area. Nearshore WECs provide comparable benefits to shoreline WECs, although they are subjected to greater wave force. Offshore WECs are subjected to stronger waves than those found in deep water. The WEC must be placed in regions with high wave energy density that are not shielded.The discussed WEC has the advantage of being able to be placed in any part of the ocean, including the coastline, near shore, and offshore. To offset the drawback of a weaker wave if the WEC is placed near the coast, ferrofluids are employed, which decrease the damping of the moveable magnet's motion and improve the WEC's efficiency. Because of its easy power take-off system, it may also be placed offshore.

5. CONCLUSION

As previously stated, a variety of power take-off methods have been suggested for use in WEC, and several have already been successfully tested. It is unclear, given the present level of technology, which of the many technologies will win the race. Electrical linear generators have a lot of good qualities; however they have a lot of weight and thus a lot of expenses. Alternatives such as dielectric elastomer generators may also prove to be viable candidate systems. Mechanical transmission systems can be the same way. However, further study is needed to understand the features of these technologies in terms of WEC application and to solve the current limitations.For the time being, WEC with floating type PMLG seems to be the best option for converting wave mechanical energy to electrical energy. The WEC uses permanent magnets and ferrofluids to capture ocean power or the hydrokinetic potential of waves. The device converts the hydrokinetic potential of waves in the ocean or any large body of water using multiple PMLG cascaded in series and parallel configurations, but it can also be used on any surface that produces perpetual oscillatory/vibratory motion to produce an electric current that can then be converted to alternating current or direct current depending on the application. Despite the fact that previous study in this area has been conducted, there is a significant need for additional research in this field in the future.

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AN OVERVIEW OF DEEP LEARNING IN HEALTHCARE

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ABSTRACT

In recent years, a rising expectation has been built around the analysis of huge quantities of data often accessible in companies, which has been examined by academics and effectively utilized by business. Big Data and Deep Learning are two of the most often used phrases in scientific circles nowadays. In this two-part study, we want to shed some light on the present status of these two distinct but connected areas of Data Science in order to better understand the current state and future development of healthcare. We begin by providing a basic review of the technical components of Big Data technologies, as well as an overview of the elements of Deep Learning methods as described in scientific literature. Then we focus on the application areas that may be claimed to have produced meaningful real-world success stories, with examples ranging from major technology firms to financial institutions, among others. The academic effort that has gone into bringing these technologies to the healthcare sector is then summarized and analyzed in two ways: first, the landscape of application examples is globally scrutinized according to the varying nature of medical data, including data forms in electronic health records, medical time signals, and medical images; and second, a specific application example is scrutinized according to the varying nature of medical data. The freely accessible MIMIC dataset includes a collection of toy application examples designed to assist novices get started with some principled, simple, and structured content and code. Current and future obstacles to the employment of both sets of methods in our future healthcare are discussed critically.

KEYWORDS: *Deep Learning, Healthcare, Data Analysis, Algorithms, Machine Learning.*

1. INTRODUCTION

Health care is entering a new age in which rich biological data is becoming more essential. Precision medicine, for example, aims to ‘ensure that the correct therapy is given to the right patient at the right time' by taking into account a variety of factors in a patient's data, such as molecular trait variability, environment, electronic health records (EHRs), and lifestyle.The

abundance of biological data presents both possibilities and difficulties for health-care research. Exploring the relationships between all of the various bits of information in these data sets, in particular, is a critical issue for developing effective medical tools using data-driven methods and machine learning. Previous research attempted to connect various data sources in order to create collaborative knowledge bases that could be utilized for predictive analysis and discovery. Predictive tools based on machine learning methods have not been extensively used in medicine, despite the fact that current models show tremendous potential. In reality, due to their high dimensionality, variability, temporal dependence, sparsity, and irregularity, making full use of biological data remains a major problem. Various medical ontologies used to generalize data (e.g. Systematized Nomenclature of Medicine-Clinical Terms, Unified Medical Language System (UMLS), International Classification of Disease-9th version (ICD-9), which frequently contain conflicts and inconsistency, exacerbate these challenges.

Across the data, the same clinical trait may be represented in a variety of ways. For instance, in EHRs, a patient diagnosed with ‘type 2 diabetes mellitus' may be recognized by laboratory results of hemoglobin A1C >7.0, the existence of the 250.00 ICD-9 code, and the mention of ‘type 2 diabetes mellitus' in free-text clinical notes, among other things. As a result, harmonizing all of these medical ideas in order to create a higher-level semantic framework and comprehend their relationships is difficult. In biomedical research, having a domain expert define the phenotypes to employ on an ad hoc basis is a typical method. The supervised specification of the feature space, on the other hand, scales poorly and loses out on new pattern discovery possibilities. Represent learning techniques, on the other hand, enable for the automated discovery of the representations required for prediction from raw data. Deep learning methods are representation-learning algorithms with multiple levels of representation. They are created by composing simple but nonlinear modules that each transform the representation at one level (starting with the raw input) into a representation at a higher, slightly more abstract level. In computer vision, voice recognition, and natural language processing applications, deep learning models performed well and showed significant promise.

Deep learning paradigms offer intriguing new possibilities for biomedical informatics, given their proven effectiveness in many areas and the fast development of methodological advances. Deep learning techniques are either being used or are being considered for use in health care. Enlitic is employing deep learningintelligence to detect health issues on X-rays and Computed Tomography (CT) scans while Google DeepMind has revealed intentions to apply its skills to health care. Deep learning methods, on the other hand, haven't been well tested for a wide variety of medical issues that might benefit from its capabilities. Many features of deep learning, such as its better performance, end-to-end learning scheme with integrated feature learning, and capacity to handle complicated and multi-modality data, may be beneficial in health care. To speed up these efforts, the deep learning research community as a whole must address several challenges related to the characteristics of health care data (i.e. sparse, noisy, heterogeneous, time-dependent), as well as the need for improved methods and tools that allow deep learning to interface with health care information workflows and clinical decision support. We explore current and upcoming applications of deep learning in medicine in this article, emphasizing the main elements that will have a major effect on health care[1]. We do not want to give a detailed background on technological specifics or generic deep learning applications. Instead, we concentrate only on biological data, including that derived from clinical imaging, EHRs, genomics, and wearable devices[2]. While new types of data, such as the metabolome, antibodyome, and other omics data, are anticipated to be useful for health monitoring, deep learning has not been utilized much in these areas to yet.

As a result, we will quickly explain the basic deep learning framework, examine some of its medical applications, and explore the possibilities, difficulties, and uses of these techniques in

the context of precision medicine and next-generation health care in the following sections.When neural networks began beating competing techniques on many high-profile image analysis benchmarks, deep learning came to prominence in computer vision. Most notably, a deep learning model (a convolutional neural network) halved the second best error rate on the picture classification challenge on the ImageNet Large-Scale Visual Recognition Challenge (ILSVRC) in 2012[3]. Until recently, enabling computers to identify things in natural pictures was considered to be a tough job, but convolutional neural networks have now exceeded even human performance on the ILSVRC, and have effectively completed the ILSVRC classification test. For a broad range of computer vision issues, deep learning methods have become the de facto norm. They are outperforming other approaches in areas like natural language processing speech recognition and synthesis and the analysis of unstructured, tabular-type data using entity embeddingsand in the analysis of unstructured, tabular-type data using entity embeddings.Deep learning's rapid advancement and broad reach, as well as the consequent spike in attention and multibillion-dollar investment, have sparked a virtuous cycle of advancements and investments throughout the whole field of machine learning. It is currently one of the most popular fields of study worldwide and machine learning experts are in great demand in both business and academia.

1.1 History Of Deep Learning In Health Care

Deep learning has already had an impact on the healthcare field. Google has invested a lot of effort looking at how deep learning models may be used to make predictions about hospitalized patients, assisting doctors with patient data and outcomes management. The blog article, titled "Deep Learning for Electronic Health Records," went on to explain how deep learning might be utilized to decrease administrative burden while improving insights into patient care and needs. This is the greatest use of deep learning in healthcare since it reduces administrative overhead while enabling medical practitioners to concentrate on what they do best: health[4]. The NHS in the United Kingdom has made a commitment to using deep learning, AI, and machine learning to become a leader in healthcare. This technology's worth has been acknowledged by the healthcare provider. The potential to improve patient care via the use of intelligence analytics and deep learning toolkits is certainly appealing to the NHS, which is beset by cost reduction, Brexit, and continuing talent shortages[5]. Investing in deep learning technologies may help the company avoid some of the historical issues that have hampered efficiency while also simplifying patient care. It may also offer much-needed assistance to healthcare practitioners. Boris Johnson pledged £250 million to deep learning in healthcare projects for the NHS in August 2019, reaffirming the fact that AI, machine learning, and deep learning will be a part of the government institution's future. While there are some concerns about AI's possible use in the NHS, a recent study published by the Lancet Digital Health Journal added to its legitimacy[6]. The performance of deep learning models was found to be comparable to that of health-care experts, according to the study.A surprising statement that came with several qualifiers but ultimately highlighted how deep learning in healthcare might help patients and health systems in real practice[7]. Medical imaging solutions, chatbots that can identify patterns in patient symptoms, deep learning algorithms that can identify specific types of cancer, and imaging solutions that use deep learning to identify rare diseases or specific types of pathology are all examples of deep learning applications in healthcare. Deep learning has proven helpful in giving medical personnel with insights that enable them to detect problems early on, allowing them to provide much more customized and relevant patient care[4].

1.2 Future Of Deep Learning In Health Care

There has never been a more exciting time in the history of healthcare. Deep learning in healthcare may become extremely effective for assisting doctors and changing patient care, not just because AI and ML provide the potential to create solutions that respond to highly particular

business requirements. Dr. Eric Topol, a cardiologist and geneticist, has released a book titled 'Deep Medicine,' in which he discusses how deep learning in healthcare may 'restore the caring in healthcare.' He eloquently explains why deep learning is so important to the healthcare industry in his interview with The Guardian. Aidoc, for example, is built on this same concept. It's not meant to take the place of a doctor, but rather to complement him or her. In the end, deep learning will not be able to replace humans, but it will provide doctors the tools they need to succeed in their chosen field. Within the radiology field, for example, Aidoc has created algorithms to speed up patient diagnosis and treatment. The Food and Drug Administration, the European Union CE, and the Therapeutic Goods Administration of Australia (TGA) have all given the business certification and clearance for its specialized algorithms. Intracranial bleeding, pulmonary embolism, and cervical-spine fracture are among the algorithms that enable the system to prioritize which individuals need medical attention the most. This specific use of AI and deep learning aids the overworked radiologist by highlighting things of concern, allowing the healthcare professional to guide patients with more control and efficiency. It also cuts down on paperwork by connecting with processes and increasing access to pertinent patient data. Is deep learning the future of healthcare as a result of all this

Yes, it's possible. Finally, medical technology is becoming more capable of incorporating AI-based algorithms that may expedite and simplify complicated data processing while also improving diagnosis[8]. It has the ability to learn and be trained. It may enhance processes and minimize reporting delays[4]. In a time and money-strapped environment, it may also be utilized to alter the standards for patient care. Deep learning will continue to gain traction in the healthcare sector, particularly now that more medical professionals are seeing its benefits. Only close cooperation with industry and specialized groups can benefit this technology. To guarantee that it is constantly relevant to the profession, it must stay flexible and adaptable. Aidoc's deep learning radiology solution has already seen many successful deployments, increasing clinician assistance and optimizing productivity. Radiologist duties are more efficiently balanced, and abnormalities are promptly recognized and prioritized. Radiologists work 10- to 12-hour days to keep up with severe workloads and industry standards, making it one of the most stressful professions[9]. They may spend more time dealing with patients and other professionals while still receiving detailed analysis of medical images and data thanks to Aidoc.While deep learning's promise in healthcare is barely being realized, it has already yielded substantial benefits. Leading organizations and medical authorities have acknowledged the advantages it provides, and the solutions' popularity has skyrocketed. AI and deep learning in healthcare applications now have their own floor, exhibit space, and talks at the RSNA conference, while they had just one or two booths in 2017. The future is still in the hands of medical experts, but they are now aided by technology that recognizes their specific requirements and surroundings and helps them cope with the everyday pressures they face[10].

1.3 Application Of Deep Learning In Health Care

For a long time, AI, machine learning, and deep learning have gotten a lot of press. Retail, banking, travel, manufacturing, healthcare, and other sectors are all being transformed by this technology. The healthcare sector is one of the industries that uses this technology the most. Because health is so important, medical professionals are always looking for innovative methods to integrate new technology and provide meaningful outcomes. In healthcare, deep learning has game-changing applications. Deep learning collects a large amount of data, such as patient records, medical reports, and insurance information, and uses neural networks to provide the best results.Medical practitioners and academics are using deep learning to uncover hidden possibilities in data and better serve the healthcare sector. Deep learning in healthcare enables physicians to correctly analyze any illness and effectively treat it, resulting in improved medical choices.

- Drug development:Deep learning in healthcare aids in the discovery and development of new medications. The technology examines the patient's medical history and recommends the most appropriate therapy. Furthermore, this technology extracts information from patient symptoms and testing.
- Imaging in medicine:Heart disease, cancer, and brain tumors are diagnosed using medical imaging methods such as MRI scans, CT scans, and ECG. As a result, deep learning assists physicians in better analyzing diseases and providing the best therapy to patients.
- Insurance swindle:Medical insurance fraud claims are analyzed using deep learning. It can anticipate fraud claims that are likely to occur in the future using predictive analytics. Deep learning also aids the insurance sector in sending discounts and offers to its target patients.
- Alzheimer's disease:Alzheimer's disease is one of the major problems facing the medical profession. Alzheimer's disease is detected early using a deep learning method.
- Genome: Deep learning is used to comprehend a genome and assist patients in gaining an understanding of diseases that may impact them. In genetics and the insurance business, deep learning has a bright future. According to Entilic, deep learning techniques are used to make physicians quicker and more precise. Cellscope employs deep learning techniques to enable parents to monitor their children's health in real time through a smart gadget, reducing the need for frequent medical visits. Deep learning in healthcare can provide amazing applications for doctors and patients, allowing doctors to make better medical decisions.

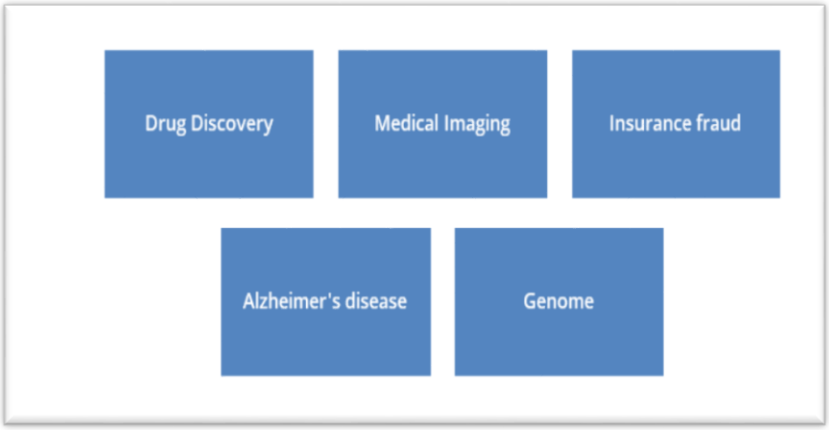

Figure 1: Diagrammatic Representation of Application of Deep Learning in healthcare [ALLERIN]

2. DISCUSSION

Despite the fact that deep learning is still in its early stages, published research have demonstrated that it is capable of making quicker and more accurate diagnoses in physiological data. That potency may prompt a move away from commonly used decision support techniques like Support Vector Machine (SVM) and K-Nearest Neighbor (K-NN) in favor of deep learning. that using deep learning to analyze ECG data resulted in promising diagnostic results. This is due to the created model's ability to capture the unique characteristics of ECG data. As a result, even without large data, the network may be trained using these learnt characteristics, resulting in acceptable diagnostic performance. The automatic analysis of EMG and EEG data, on the other hand, is more difficult due to their chaotic character. As a result, learning from the hidden and nuanced information contained in these signals is more difficult for the network.During the content evaluation, we looked at the many kinds of DL algorithms they utilized in their study. The number of research that utilized a specific DL method to evaluate physiological data is

shown in Table 6. CNN was utilized in five, fifteen, ten, and two studies on EMG, EEG, and ECG, respectively. CNN was used 32 times in total, making it by far the most common deep learning method. LSTM, which was solely utilized for ECG processing, is at the bottom of the table. Deep learning systems' training methods have a significant computational complexity. As a consequence, the run-time complexity is considerable, resulting in a lengthy training time. This will be an issue throughout the design process, since a designer must choose which deep leaning architecture to utilize during this phase. The tuning settings must be changed once the architecture has been selected. The model will be influenced by both structure selection and parameter adjustments. As a result, numerous test runs are required. Shortening the deep leaning model's training period is a hot topic of study. In a parallel distributed processing system, the issue is to speed up the training process. The bottleneck is the network connecting the individual CPUs. Network latency may be reduced using graphics processing units (GPUs).

3. CONCLUSION

Deep learning techniques based on physiological inputs are used to healthcare applications. The investigation was divided into two parts.The bibliometric keyword analysis based on the co-occurrence map was the initial stage. The link between the subjects addressed in the evaluated articles is shown in this stage of the analysis. Four distinct clusters were discovered, one for each physiological signal. This result aided us in structuring the second analysis step, which is concerned with the content of the paper. As a result, the content of the article was determined by extracting information on the particular application area, the deep learning method, system performance, and the kinds of datasets utilized to build the system.The ability of deep learning algorithms to perform effectively on vast and varied datasets has two implications. For starters, the dataset becomes essential to the system's architecture. As a result, we concentrated our efforts throughout our study on this criterion. We discovered that 31 of the evaluated articles used one or more publicly accessible datasets in their scholarly work. As a result, we believe that the value of these publicly accessible public statistics will grow. Another result is that deep learning algorithms will perform well in real-world situations, since clinical practice generates a lot of data with a lot of variety. However, none of the studies that were evaluated were able to demonstrate this in a real-world context. Another important thing to note is that our literature search turned up just 53 articles. The small number of studies suggests that more research is needed. To be more precise, 53 articles do not represent the whole range of physiological signal-based healthcare applications. More sophisticated deep learning algorithms focusing on the early identification of illnesses utilizing physiological signs may be developed in the future.

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OPTIMIZATION METHODS FOR THE DESIGN OF POLYGENE RATION SYSTEMS IN DISTRICT HEATING AND COOLING NETWORKS ARE REVIEWED

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ABSTRACT

The present rise in energy costs, as well as the current energy supply's limitations The adoption of novel energy production methods, such as hybrids, is encouraged by resources. High-energy-efficiency integrated systems (using fossil fuels and renewable energy sources). Polygene ration systems are a kind of integrated system. Generate electrical, heating, and cooling at a greater level in various circumstances efficiency than a traditional system, as well as a diverse set of technologies. With a variety of setups, the design of these systems may be complex at times. Carried out with the help of solved and optimized mathematical models Minimizing investment and operating expenses is important, but these optimizations are also important. Techniques are commonly used in industrial settings, but very rarely in residential settings. Applications in buildings or district heating and cooling (DHC). The purpose of this article is to provide a survey of the optimization literature. Methods for developing or DHC apps that have been utilized in the past. TheThe primary goal of this study is to provide the groundwork for the creation of an For the synthesis and design of polygene ration systems, an optimization tool has been developed. its use in efficient district heating and cooling networks their financial investment and operating costs to demonstrate the concept, an example is given This tool's application.

KEYWORDS:*Polygene Ration Systems Optimization, District Heating And Cooling Optimization.*

1. INTRODUCTION

Energy system optimization is a significant problem in the creation of more sustainable development models, particularly in metropolitan settings, where almost all electrical energy is generated in distant large-scale power plants, but cooling and heating needs are met locally in

each residence or structure. In the year 2000, according to the Plan de Acción E4 (a plan for energy savings and efficiency in Spain for the period 2004-2012), 58.4 percent of converted energy was wasted owing to conversion system efficiency and transportation losses. The heavy usage of electrical compression refrigeration units in the summer, as well as electrical heating units in the winter, in temperate areas like Spain, results in intense use of the electrical network, with historical demand peaks in the winter and summer that increase year after year. District Heating and Cooling networks (DHC) and Distributed Energy Systems (DES) are a more dependable and long-term solution. Energy is generated locally, with no energy losses. Furthermore, combining multiple technologies with the usage of renewable energy sources reduces primary energy consumption and pollution emissions. Alanne and Saari go into more depth on the differences between centralized and distributed energy systems [1].

This paper's goal is to look at optimization methods for DHC and DES applications in both residential and industrial settings. The review has been focused and structured according to the main topics involved, due to the lack of previous research on optimization methodologies applied to all the considered technologies integrated in a unique energy supply system (DHC, DES, and renewable energies), due to the lack of previous research on optimization methodologies applied to all the considered technologies integrated in a unique energy supply system (DHC, DES, and renewable energies). Optimization methods, DHC layout, energy supply system design, users' network connection, users' demand modeling, and lastly, the technologies involved in the production energy system The creation of a tool that integrates all of the previously stated subjects will be a future outcome of this study. For heat and power producing systems, optimization algorithms are often employed to identify the optimum alternative configuration or production schedule. Mathematical programming is the most popular technique for DES and DHC, although other approaches like as genetic algorithms, neural networks, and fuzzy logic systems are also often employed. Literature has a broad categorization, review, and short lesson on all of these methods.

Optimization based on several criteria In most optimization issues, there are many conflicting and non-comparable criteria. Economic factors are the most frequent, but additional criteria such as pollutants emissions (environmental criteria), product quality, safety, and flexibility must also be considered. Multicriteria algorithms may be used to compare various power plant types, for example [2] .Calculation of energy demand and load The most essential data for the modeling and optimization process is energy demand. The kind and frequency of the available energy demand data may influence the optimization method used. Simulation tools like TRNSYS or Energy Plus are the most popular method to determine load demand for individual buildings. In other instances, simulation models for calculating energy demand are created using geographical data, consumer type, historical consumption data, and other regional factors. Other models employ recent load data and neural networks to improve load estimation, identify deviations from the expected trend, and correct energy demand predictions, because building simulation programs cannot accurately account for all possible user behaviors affecting the building's energy demand. Regional planning and DHC optimization There are few examples of models that optimize both manufacturing locations and the district network in the literature. Söderman and Pettersson provide an example of a MILP issue that yields the DES structure and the optimum user connection via the primary DH previously established route. There are several commercial DHC simulation programs available, such as TERMIS and WinDes.

TIMES is a mathematical model (MILP implemented in GAMS) that may be utilized on a local, regional, national, or global scale for regional planning. A source of renewable energyBy far the most integrated renewable energy source in urban electricity supply networks is solar energy is an example of their integration in a DHC network. Due to their greater efficiency than direct biomass combustion, biomass gasification for electrical and thermal energy generation is presently garnering a lot of attention[3].In many instances, a single company owns huge

combined heat and power district heating systems. This was common in the former Eastern Bloc nations. However, in many designs, the cogeneration facility is owned separately from the heat-using portion. Warsaw, for example, has a split ownership structure, with PGNiG Termika owning the cogeneration unit, Veolia owning 85% of the heat distribution, and the municipality and employees owning the remaining heat distribution. Similarly, all of Denmark's major CHP/CHP systems are shared ownership. Sweden offers an alternate example of a deregulated heating industry. The ownership of the district heating network is often not separated from the ownership of cogeneration plants, district cooling networks, or centralized heat pumps in Sweden. There are other instances of parallel networks and linked networks where different utilities collaborate as a result of the rivalry. There have been concerns in the United Kingdom that district heating firms have too much of a monopoly and are not adequately regulated, a problem that the industry is aware of and is working to address via the use of customer charters established by the Heat Trust. Some consumers are suing the provider for misrepresentation and unfair trading; alleging that district heating does not achieve the savings that many heat suppliers advertise.

Every district heating system is different because circumstances vary from city to city. Furthermore, since countries have varied access to main energy carriers, they have various approaches to dealing with heating markets inside their boundaries. Euroheat & Power has pushed district heating throughout Europe since 1954. Within their Ecoheatcool project, which is funded by the European Commission, they produced a study of European district heating and cooling markets. According to a second research dubbed Heat Roadmap Europe, district heating has the potential to lower energy prices in the European Union between now and 2050. [49] The EU's CHP Directive is presently influencing the legislative framework in member states of the European Union.Through the CHP Directive, the EU has aggressively integrated cogeneration into its energy strategy. "Security of supply truly begins with energy efficiency," Energy Commissioner Andris Puebla's said during a meeting of the European Parliament's Urban Lodgment Intergroup in September 2008. The Cogeneration Directive 2004/08/EC of the European Union recognizes energy efficiency and cogeneration in the first paragraphs. This directive aims to promote cogeneration and create a system for measuring each country's cogeneration capabilities. The evolution of cogeneration has been uneven throughout the years, and national conditions have dominated the past several decades. The European Union as a whole now produces 11% of its energy via cogeneration, saving Europe an estimated 35 Mtoe per year. However, there are significant variations across member states, with energy savings ranging from 2% to 60%.

Denmark, the Netherlands, and Finland are the three nations in Europe with the world's most extensive cogeneration economy. Other European nations are working hard to improve their efficiency as well. According to Germany, cogeneration may provide more than half of the country's entire energy consumption. Germany has set a goal of doubling its energy cogeneration from 12.5 percent to 25 percent by 2020, and has approved legislation to achieve this goal at the "Federal Ministry of Economics and Technology," (BMWi), Germany, August 2007. The United Kingdom is likewise a strong supporter of district heating. The government established a goal to obtain at least 15% of government energy from CHP by 2010 in order to meet the UK's objective of reducing carbon dioxide emissions by 80% by 2050. Financial incentives, grant assistance, a stronger regulatory framework, and government leadership and collaboration are among the other UK initiatives to promote CHP development. According to the IEA's 2008 cogeneration expansion modeling for the G8 nations, expanding cogeneration in France, Germany, Italy, and the United Kingdom alone would virtually quadruple current primary fuel savings by 2030. Savings in Europe would rise from 155 TWh now to 465 TWh in 2030. From 2030, each country's total cogenerated energy would have increased by 16 percent to 29 percent. Organizations like COGEN Europe, which serves as an information center for the most current

changes in Europe's energy legislation, help governments in their CHP efforts. COGEN is Europe's umbrella group, representing the cogeneration industry's interests, users of the technology, and promoting its advantages in the EU and beyond. Gas and electricity companies, ESCOs, equipment suppliers, consultancies, national promotion organizations, banking and other service businesses are among the members of the association. The Power Plant for District Heating Steyr is a sustainable combined heat and power plant that generates electricity from wood chips. Vienna (Firmware Wien) is Austria's biggest district heating system, with numerous smaller systems scattered throughout the nation.

Wien Energie is in charge of district heating in Vienna. A total of 5.163 GWh was sold in the 2004/2005 business year, with 1.602 GWh going to 251.224 individual flats and homes and 3.561 GWh going to 5211 large clients. The three major municipal trash incinerators produce 116 GWh of electric power and 1.220 GWh of heat, accounting for 22% of the total. 72 percent of the total is waste heat from municipal power plants and big industrial facilities. The remaining 6% is generated by fossil-fuel-fired peak heating boilers. Since 2006, a biomass-fired power plant has provided heat. In the remainder of Austria, modern district heating facilities are built as biomass or CHP-biomass plants, such as Mödling's biomass district heating or Baden's biomass district heating. The majority of older fossil-fired district heating systems include a district heating accumulator, which allows thermal district heating power to be produced only when electric power prices are high.

2. DISCUSSION

2.1. APPLICATION:

The energy demand and expenses, efficiency curves, technical operational limitations, and the selection of which technologies should be included in the optimization model are the model's input parameters. Sun plant output is estimated using solar irradiation for Barcelona (where the polygene ration facility is situated), orientated south and at a 30o angle. The thermal energy output of the plant for each time period is calculated using the efficiency equation for the chosen collectors and the average number of solar daily light hours.

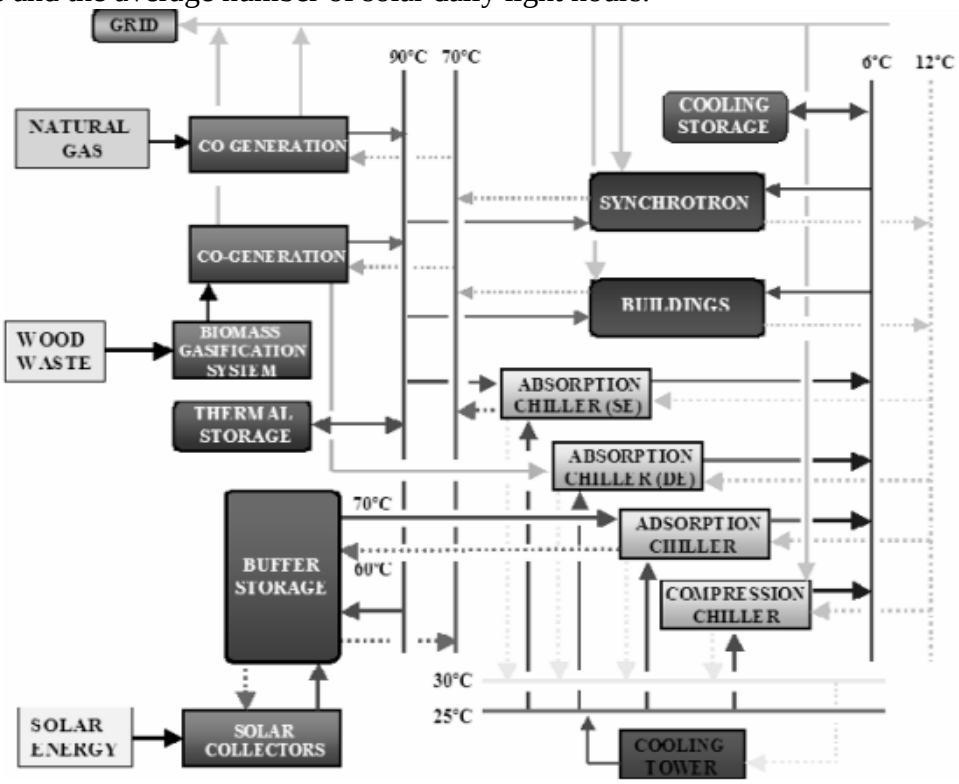

Figure 1. Example of polygene rations system to be optimized using the NLP model.

The energy demand is available for 15-day intervals, dividing the year into 24 parts. The model can be used to compare several alternatives using different technologies, for example, the best solution for a conventional case with boilers and compression chillers can be compared to the best solution for a cogeneration or trigeneration system, and the best solution for the PolyCity project can be compared to the best solution for a conventional case with boilers and compression chillers. Renewable and distributed energy systems, alternatively, result in significant savings in terms of primary energy and CO2 emissions, as demonstrated.Figure1.Example of polygene rations system to be optimized using the NLP model [4].

2.2.ADVANTAGE:

The model's outputs are the technologies used in the final optimum solution, the unit's nominal size, and the operating conditions for scheduling cooling units for the PolyCity system to meet cooling demand. The simple effect absorption chillers supply the base load, while the compression chillers give the peak demand. Adsorption and double effect absorption chillers operate at full capacity nearly all of the time (whenever feasible) to recover all available solar energy and to take advantage of their greater efficiency. The creation of software for the optimization of DES and DHC will be a future application of this study, taking into account all of the factors examined in this review (DES, DHC, user connection, integration of renewable energy technologies, and so on). Another tool in the works will show a 3D scenario of a zone included in the DES and DHC, which may be a single structure, a street, or many districts. This program will be utilized for DHC routing, building energy demand analysis, user connection, and will include DES and renewable energy computation and optimization [5].

2.3.*WORKING*:

District heating (also known as heat networks or teleheating) is a method for distributing heat produced in a centralized place for residential and commercial heating needs such as space heating and water heating via a series of insulated pipes. Heat is often supplied from a cogeneration plant that burns fossil fuels or biomass, although heat-only boiler stations, geothermal heating, heat pumps, and central solar heating, as well as waste heat from nuclear power electricity generation, are also utilized. Compared to localized boilers, district heating facilities may offer greater efficiency and better pollution management. District heating with combined heat and power (CHPDH) is the cheapest way of reducing carbon emissions, according to some studies, and has one of the lowest carbon footprints of all fossil generating facilities. Fifth-generation district heat networks do not utilize combustion on-site and produce zero CO2 and NO2 emissions; instead, they use electricity to transmit heat, which may be produced from renewable energy or from distant fossil-fuelled power plants. The Stockholm multi-energy system employs a mix of CHP and centralized heat pumps. This enables for the creation of heat through electricity when intermittent power production is abundant, and cogeneration of electric power and district heating when intermittent power production is scarce.In general, all contemporary district heating systems are demand driven, which means that the heat provider responds to customer demand and guarantees that the temperature and water pressure are adequate to give the desired heat to the users. The five generations have distinguishing characteristics that distinguish them from previous generations. Each generation's

characteristic may be utilized to determine the state of development of an existing district heating system [6].

The first generation was a coal-fired steam system that was initially developed in the United States in the 1880s and quickly gained popularity in Europe. It was state-of-the-art until the 1930s, and it utilized concrete ducts and worked at very high temperatures, making it inefficient. Due to the heated, pressured steam tubes, there were additional issues with dependability and safety. This generation is now technologically obsolete. Some of these systems, such as those in New York and Paris, are still in operation. Other systems that were constructed in the past have been converted to later generations a new generation The second generation began in the 1930s and continued into the 1970s. It used coal and oil to generate energy, which was then transferred through pressured hot water as a heat carrier. Water pipes in concrete ducts, mainly built on site, and heavy machinery were utilized in the systems, which had supply temperatures exceeding 100 °C. The principal energy savings that resulted from utilizing combined heat and power plants were a major driver for these systems. The soviet-style district heating systems that were constructed after WWII in many nations in Eastern Europe were typical systems of this generation, but they were also utilized in other countries. The third generation was created in the 1970s and has since been utilized in the majority of the following systems all over the globe. Because many of the district heating component manufacturers are located in Scandinavia, this generation is also known as "Scandinavian district heating technology." The third generation employs prefabricated, pre-insulated pipes that are placed directly in the ground and operate at lower temperatures, often below 100 degrees Celsius. After the two oil crises, which resulted in interruption of the oil supply, one of the main motivations for constructing these systems was to improve energy efficiency and ensure supply security. As a result, instead of oil, such systems often utilized coal, biomass, and trash as energy sources. Geothermal and solar energy are also utilized in the energy mix in certain systems. Since the 1970s, Paris has used geothermal heating from a 55–70 °C source 1–2 km under the surface for residential heating. The fourth generation is currently being developed, with the transition to the fourth generation already underway in Denmark[7]. By offering great flexibility to the electrical grid, the fourth generation is intended to fight climate change and incorporate large percentages of variable renewable energy into district heating. The ability to provide existing buildings, energy-renovated existing structures, and new low-energy buildings with low-temperature district heating for space heating and domestic hot water (DHW)."The ability to transfer heat in low-grid-loss networks."The ability to recycle low-temperature heat and incorporate renewable heat sources such as solar and geothermal heat. Ability to be a component of smart energy systems (i.e. integrated smart electricity, gas, fluid, and thermal grids), including 4th Generation District Cooling systems."The ability to guarantee appropriate planning cost, and incentive structures in connection to operations as well as strategic investments linked to the transition to future sustainable energy systems."

Temperature levels have been lowered in comparison to earlier generations to improve the system's energy efficiency, with supply side temperatures of 70 °C and lower. Waste heat from industry, waste-burning CHP plants, biomass power plants, geothermal and solar thermal energy (central solar heating), large-scale heat pumps, waste heat from cooling and data centers, and other sustainable energy sources are all potential heat sources. Fourth-generation district heating

systems are expected to provide flexibility for balancing wind and solar power generation with those energy sources and large-scale thermal energy storage, including seasonal thermal energy storage, for example by using heat pumps to integrate surplus electric power as heat when there is a lot of wind energy or providing electricity from biomass plants when backup power is needed. As a result, large-scale heat pumps are seen as a crucial technology for smart energy systems that use up to 100 percent renewable energy and sophisticated fourth-generation district heating systems [8].

3. CONCLUSION

A number of elements of DES and DHC system optimization have been examined. The most significant disadvantage is the difficulty in determining energy demand, as well as the growing complexity in energy system optimization when a large number of time periods are taken into account. The PolyCity case study was used to create an NLP model for the optimization of a polygeneration plant with a district cooling and heating network, which used fossil (natural gas) and renewable energy (solar and biomass) concurrently with a highly variable energy demand. In comparison to the traditional scenario (electricity purchase, thermal energy generated by boilers, and cooling demand met by compression chillers), primary energy consumption is reduced by 52%, and CO_2 emissions are reduced by 29%. In each time slice examined, the model was utilized to determine the units' optimal size and load.When opposed to individual heating systems, district heating offers a number of benefits. Due to the simultaneous production of heat and electricity in combined heat and power generating facilities, district heating is usually more energy efficient. This also has the advantage of lowering greenhouse gas emissions [9]. In comparison to single boiler systems, the bigger combustion units feature a more sophisticated flue gas cleaning system. District heating systems do not require extra fuel since they collect heat that would otherwise be distributed to the environment in the event of excess heat from industry. District heating necessitates a long-term financial commitment that clashes with short-term investment rewards. Community benefits include decreased investment in individual home or building heating equipment and saved energy expenditures via the utilization of excess and discarded heat energy. District heating networks, heat-only boiler stations, and cogeneration facilities all require a significant amount of upfront capital and finance. These will only be lucrative for owners of district heating systems or operators of combined heat and power plants if they are seen as long-term investments. District heating is less appealing in low-population regions since the investment per home is much greater. It's also less appealing in regions with a lot of tiny structures, such as detached homes, than in places with a lot of bigger buildings, such as blocks of flats, since each connection to a single-family dwelling is very costly. Individual heating systems, unlike district heating systems, may be fully shut down periodically in response to local heating demand [10].

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ETHICS MORALITY AND NATIONAL-SPIRITUAL VALUES

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ABSTRACT

This article scientifically and philosophically explores the views on the concepts used to demonstrate the universal, socio-ethical, spiritual and cultural significance of certain events in value reality.The views of each nation on the presentation of national values without taking into account its history, spirituality, culture, unique customs and traditions are studied from a scientific and theoretical point of view.

KEYWORDS:*Values, Morality, Spirituality, Culture, Customs, Traditions, Nation, Ethnos, Spiritual Heritage.*

INTRODUCTION

Morality is an integral part of our national values. It is difficult to imagine the national values of any nation without its history, spirituality, culture, unique customs and traditions.

ANALYSIS OF THE LITERATURE ON THE SUBJECT: When we say "value", we must understand the set of natural and social blessings and events that serve the interests and goals of nations, peoples and social groups that are important for man and humanity and are valued and valued by them [1; 198].

Values are a set of people who have prestige, prestige, respect, prestige, relationships, situations, material possessions and spiritual wealth among people in society [2; 20].

Values are diverse in nature. Natural, material, spiritual, socio-political and moral values stand out among them. Nevertheless, the highest of values is man himself, his life, his rights and freedoms, his healthy and prosperous life. The glorification of human dignity is an important factor in the purification and development of our society [3; 333].

RESEARCH METHODOLOGY: Value is an integral part of the spirituality of man and society, a concept used to express the value of events, happenings, processes, situations, qualities, demands and procedures in the universe.

Value is a concept used to show the universal, socio-ethical, spiritual and cultural significance of certain events in reality.

National values are a form of identity associated with ethnicity and characteristics that are important to a nation. There is no nation in the world without its own values. National values are inextricably linked with the history, way of life, spirituality and culture of the nation.

G. Gafurov mentioned the following manifestations of national values dedicated to national traditions: 1) natural values; 2) economic values; 3) socio-political values; 4) moral values; 5) moral values [4; 2]. In particular, our ancestors, along with the study of science, instilled in our children the national-spiritual, moral values that are passed down from generation to generation. This is the highest spiritual value, the jewel of the human soul.

Economic value is a concept that means the consideration of mutual interests between individuals in the process of economic relations, the implementation of such qualities as honesty, purity, tolerance, reliability [5; 241].

Spiritual heritage, cultural riches, ancient historical monuments are cited as the most important factors of life values. The essence and significance of each value is determined on the basis of the ability to know the phenomena of nature, society and the spiritual world, to generalize scientifically, to influence social and spiritual development.

Spirituality and culture, which are the basis of national values, mean the beauty of human behavior, generosity, nobility, fidelity to the promise, imagination, knowledge, wisdom, tolerance, decency, cleanliness and purity of heart, sincerity and kindness.

A polite, knowledgeable, hard-working, faithful child is the greatest wealth not only of a parent, but of the whole society. Indeed, every child is formed in an individual family. So, the family is the foundation of a harmoniously developed generation. Therefore, the moral and legal upbringing of children in the family, especially the formation of justice, duty, patriotism, awakening a sense of love for the motherland is very important.

Raising children in the family in the spirit of devotion to their duty is closely linked with such qualities as responsibility, awareness, conscience. At the same time, the sincere relationship between parents, their close and friendly relations with their children, their understanding of their future dreams and goals, will be the basis for the healthy development of children.

When a person has good manners, habits, and intelligence factors in the process of upbringing, he understands life lessons so well and does good deeds, and conversely, the less educated he is, the less life skills he has, sometimes knowingly or unknowingly commits bad deeds. Uradi [6; 19].

We must never lose sight of the mistakes we make in raising children. In our present life, there are some people who are rude, ignorant, and stupid, addicted, addicted to their parents and cause their children to live unhappily. Is it their parents who are to blame? Their child’s human behavior was caused by their indifference to upbringing.

ANALYSIS AND RESULTS: The main purpose of education is to bring up young people to be happy, dear, respected and selfless people of their time.

Any upbringing, especially counseling, begins in the family. The main purpose of education is to bring up people who love each other. Parents should not forget that today a person who does not pay attention to the upbringing of their children will be left homeless and familyless years later.

Abu Hamid al-Ghazali says the following about parenting: “Know! Raising a child is one of the most important things. The child is entrusted to the father and mother. The child's heart is pure, delicate, simple and a jewel free from any patterns and images. It is formed according to the pattern in which it is placed, it bends in the direction of the bend. If a child learns goodness and grows up in goodness, he will find happiness in this world and in the hereafter.

Types of values are personal, professional, national, regional universal. Typology of cultural values of cultural values. Value is a very important event in people's lives. It is divided into economic, technical, social, political, artistic, scientific, moral values. From a formal point of view, value can be distinguished into positive and negative, specific constant, independent and conditional.

In material terms, value is emotional (i.e., a simple sense organ) —it is the value of life, domestic, technical, satisfaction, and so on; divided into spiritual-scientific, moral, aesthetic, religious and others. It is not difficult to determine that some values (economic, technical, political) acquire a historical character, that is, they change with the change of culture, period; other values are permanent, universal (moral, artistic). The second level is related to the choice of image movements or activities that are of interest to social groups that are close to a particular individual.

The third level is the choice of the highest universal goals, which is manifested in the embodiment of goodness, beauty, truth, justice, order, and other opposing evils, lies, ugliness, disorder, and poverty. Values differ sharply in relation to the national and specific civilization of each society. At all times, in all nations, the highest values are expressed in such criteria as kindness, labor, life, love, happiness. National values are a complex socio-spiritual phenomenon that covers all aspects of the language, culture, history, customs, traditions, material and spiritual wealth, economic, socio-political life of the nation.

Universal values are deep and broad in content and have universal significance. Universal values are in line with the goals and aspirations of all nations, peoples and peoples.

Of course, this blessing is shared by his parents, his teacher, and everyone who brought him up. If a child is neglected, grows up in evil, he will suffer misery and perish. In this case, the burden of guilt falls on those who put it, the parents. “In this regard, Allah warns in Surat at-Tahrim: "O you who believe, protect yourselves and your families from the Fire." [7: 121]

With the emergence of humanity, its language, customs, traditions, religion, culture began to emerge moral qualities that represent goodness. Their content reflects the way of life, culture, spirituality, way of life, thoughts of the people.

National values are inextricably linked with the history, way of life, culture and spirituality of the nation.

National values: are formed in an ethnic space that ensures the natural, historical and social unity of people, manifests itself in a variety of ways, has a unique impact on people's consciousness, lifestyle; It is reflected in human relationships, social activities, and is the spiritual basis for these attitudes, activities, goals, needs and aspirations: their emergence as a specific result in the material, spiritual, economic, political and other spheres. , they can have a special significance as a necessity for people, they can also benefit them; in the process of social development, changes and improvements, colorful aspects are passed down from generation to generation, inherited.

CONCLUSION/ RECOMMENDATIONS

Formation of high spiritual qualities such as moral, religious, legal, belief, honesty, corresponding to different forms of values, material, spiritual, cultural, national, universal, regional, social, political spheres of economic, social consciousness.

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GRAMMATICAL CATEGORY IS A UNITY OF GRAMMATICAL FORM AND GRAMMATICAL MEANING

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ABSTRACT

Grammar is a system of rules which governs the production and use of utterances in a given language. Grammar has its fundamental notions. The basic notions dealing with the analysis of the categorical structure of the word: grammatical form, grammatical meaning, grammatical category, paradigm. A grammatical category is a class of units (such as noun and verb) or features (such as number and case) that share a common set of grammatical properties. Also called grammatical feature.R.L. Trask notes that usage of the term category in linguistics "is so varied that no general definition is possible; in practice, a category is simply any class of related grammatical objects which someone wants to consider" (A Dictionary of Grammatical Terms in Linguistics, 1996).

KEYWORDS: *Grammatical Form, Categorical, Linguistics, Countability.*

INTRODUCTION

The term category in some approaches [to language] refers to the classes themselves, e.g., noun, verb, subject, predicate, noun phrase, verb phrase. ... More specifically, it refers to the defining properties of these general units: the categories of the noun, for example, include the number, gender, case, and countability; of the verb, tense, aspect, voice, etc. A distinction is often made between grammatical categories, in this second sense, and grammatical functions (or functional categories), such as subject, object, complement.

Grammatical categories are the building blocks of linguistic structure. They are sometimes called 'lexical categories' since many forms can be specified for their grammatical category in the lexicon. However, we will not use the term lexical category here because the term grammatical category is more widely understood, and the category of a word depends as much on how the word is used in discourse as on its conventionalized (lexical) meaning. «Grammatical categories are grammatical properties of notional parts of speech and they are considered as a unity of notions of grammatical meaning and grammatical form. The grammatical meaning is a general, abstract meaning which embraces classes of words. The grammatical meaning depends on the lexical meaning and is connected with objective reality indirectly, through the lexical meaning. The grammatical meaning is relative, it is revealed in relations of word forms: speak — speaks. The grammatical meaning is obligatory. Grammatical meaning must be expressed if the speaker

wants to be understood. The grammatical meaning must have a grammatical form of expression (inflexions, analytical forms, word-order, etc.). Compare the word forms walks, is writing. Both forms denote process, but only the second form expresses it grammatically. The term, form _ may be used in a wide sense to denote all means of expressing grammatical meanings. It may be also used in a narrow sense to denote means of .expressing a particular grammatical meaning (plural, number, present tense, etc.).

MAIN PART

Grammatical elements are unities of meaning and form, content and expression. In the language system there is no direct correspondence of meaning and form. Two or more units of the plane of content may correspond to one unit of the plane of expression (polysemy; homonymy). Two or more units of the plane of expression may correspond to one unit of the plane of content (synonymy).

It is important to keep in mind that a grammatical category is a linguistic, not a real-world, category and that there is not always a one-to-one correspondence between the two, though they are usually closely related. For example, 'tense' is a linguistic category, while 'time' is a category of the world. While past tense usually expresses past time (as in I saw a movie last night), the past-tense auxiliary in the following expresses future time: I wish you would go. And the present-tense verb of I leaves tomorrow expresses future time.

Words are assigned to grammatical categories in traditional grammar on the basis of their shared semantic, morphological and syntactic properties. The kind of semantic criteria (sometimes called 'notional' criteria) used to categorize words in traditional grammar are illustrated in the much-simplified form below:

- Verbs denote actions (go, destroy, buy, eat etc.)
- Nouns denote entities (car, cat, hill, John etc.)
- Adjectives denote states (ill, happy, rich etc.)
- Adverbs denote manner (badly, slowly, painfully, cynically etc.)
- Prepositions denote location (under, over, outside, in, on etc.)

However, semantically based criteria for identifying categories must be used with care: for example, assassination denotes an action but is a noun, not a verb; illness denotes a state but is a noun, not an adjective and Cambridge denotes a location but is a noun, not a preposition. [1]

Although terminology is not always consistent, a distinction should be made between these grammatical categories (tense, number, etc.) and lexical categories, which are closely synonymous with the traditional parts of speech (noun, verb, adjective, etc.), or more generally syntactic categories. Grammatical categories are also referred to as (grammatical) features.

The name given to a grammatical category (as an uncountable noun) is generally also used (as a countable noun) to denote any of the possible values for that category. For example, the values available in a given language for the category "tense" are called "tenses", the values available for the category "gender" are called "genders", and so on.

Categories may be described and named with regard to the type of meanings that they are used to express. For example, the category oftense is considered to serve to express time of occurrence (as in past, present or future). However, purely grammatical features do not always correspond simply or consistently to elements of meaning, and different authors may take significantly different approaches in their terminology and analysis. For example, the meanings associated with the categories of tense, aspect and mood are often bound in up verb conjugation patterns

that do not have separate grammatical elements corresponding to each of the three categories; see Tense–aspect–mood.

The term "grammatical category" refers to specific properties of a word that can cause that word and/or a related word to change in form for grammatical reasons (ensuring agreement between words). For example, the word "boy" is a noun. Nouns have a grammatical category called "number". The values of number are singular (one) andplural (two or more).

1. The boy is playing.

2. The boys are playing.

In sentence 1, "boy" is in its basic form, giving its "number" the value of singular. There is one boy and the related auxiliary verb "to be" is in the singular form (is).

In sentence 2, the form of "boy" has changed to "boys", giving its "number" the value of plural. There is more than one boy and the related "to be" is in the plural form (are). In the above example, the "number" of "boy" influences the form of boy, and also influences the form of a related word (be). "Number" is a "grammatical category".

Grammatical categories are made up by the unity of identical grammatical meanings that have the same form (e.g. singular::plural). Due to dialectal unity of language and thought, grammatical categories correlate, on the one hand, with the conceptual categories and, on the other hand, with the objective reality.

It follows that we may define grammatical categories as references of the corresponding objective categories. For example, the objective category of time finds its representation in the grammatical category of tense, the objective category of quantity finds its representation in the grammatical category of number. Those grammatical categories that have references in the objective reality are called referential grammatical categories. However, not all of the grammatical categories have references in the objective reality, just a few of them do not correspond to anything in the objective reality. Such categories correlate only with conceptual matters:

They are called significational categories. To this type belong the categories of mood and degree. Speaking about the grammatical category of mood we can say that it has modality as its conceptual correlate. It can be explained by the fact that it does not refer to anything in the objective reality – it expresses the speaker's attitude to what he says.

Grammatical categories connect grammar and semantics. They are central to the syntactic structure of clauses; in logic they are important for the analysis of propositions. Briefly, case has to do with the relations between the verb in a given clause and the nouns; aspect has to do with the type of situation and whether the speaker presents a situation as on-going or completed; tense has to do with events being located in past, present or future time by the speaker; mood has to do with whether the speaker presents an event as a fact, a possibility or a necessity, with whether the speaker witnessed a given event directly or has merely heard about it - in short, with the attitudes and expectations of speakers regarding states of affairs and propositions.

Reference grammars of particular languages devote much space to grammatical categories but little or none to constituent structure. Constituent structure does not cause major problems for the non-native learners of a given language but its systems of case-marking, mood, tense and aspect do. All reference grammars for non-native learners covertly use theories of tense, aspect, etc. and a useful exercise for students of languages and linguistics is to compare a given reference grammar with theoretical work on a given category.

A grammatical category is a set of syntactic features that: express meanings from the same conceptual domain; occur in contrast to each other; are typically expressed in the same fashion[2].

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AN OVERVIEW OF THERMAL ENERGY STORAGE AND CONTROL TECHNOLOGIES SOLAR COOLING STRATEGIES

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ABSTRACT

This study examines thermal storage medium as well as system design alternatives for solar cooling applications. The study is focused on solar cooling applications with heat inputs ranging from 60 to 250 degrees Celsius. High temperature (4100 1C) high efficiency cooling applications are given special consideration, which have been mainly neglected in previous evaluations. The applicability of sensible and latent heat storage materials for double effect and triple effect chillers has been tabulated. It has been given an overview of system designs for water storage (sensible heat) and phase change material storage (latent heat). The article covers the literature on solar thermal air-conditioning systems from both a material and a plant perspective. This involves assessing different management methods for controlling the thermal storage that assist in the efficient operation of a solar air conditioning system. The numerous modeling methods for sizing the solar thermal store are discussed, emphasizing the significant differences in particular storage size when used in various applications.

KEYWORDS:*Thermal Energy Storage, Control Strategy, Solar Cooling, Solar Air-Conditioning, Optimization.*

1. INTRODUCTION

Solar thermal cooling systems utilize solar thermal collectors to convert incoming solar radiation into heat, which is then used to produce cooling through a thermally activated cooling device such as an absorption or adsorption chiller, desiccant system, or ejector refrigeration system. Solar cooling is gaining popularity, with a rising number of installations across the globe. Solar energy; however, is a finite resource. While solar photovoltaic technology is getting more cost-effective at generating electricity, it cannot deliver “firm” power without the additional expense of battery storage. As a consequence, while planning a solar-powered electrical grid, system designers must include in the entire cost of I energy supply and (ii) diurnal matching with demand, as well as the additional cost of storage. Solar cooling provides an alternate method for both lowering emissions and controlling solar intermittency in hot regions, where air-conditioning is responsible for a significant portion of greenhouse gas emissions and dominates

peak energy demand .Solar thermal cooling technology, in particular, provides a considerably less expensive method of storing energy, resulting in lower total system costs [1].

Low-cost thermal storage may prove to be a major advantage for controlling energy flows in the retail electricity market, just as it is a key reason for concentrating solar output in the wholesale electricity market. In a solar cooling system, the use of thermal storage may improve the percentage of total building energy demand that can be provided by solar. Although there have been review articles on thermal energy storage, they have mostly concentrated on the storage medium and heat exchanger design elements of a solar cooling system. A plethora of information on thermal storage for solar thermal power generating systems is also accessible. However, none of these reviews have adequately documented the integration aspects of a thermal storage system in the design of a solar cooling plant, nor have they covered the system control approaches required for managing the thermal store's charging and discharging in order to maximize cooling output and achieve reliable operation. This study focuses on thermal storage for high efficiency double effect and triple effect absorption chillers, in addition to these thermal storage integration problems. Because high chiller efficiency may possibly allow solar collector area to be decreased, this is a relatively recent field of solar cooling research with the potential to improve the overall economics of solar thermal cooling systems [2]. When opposed to just utilizing solar heat (as is for hot water or space heating) without additional conversion to chilling, White and Goldsworthy emphasize the necessity of high efficiency chillers as the sole method to truly enhance the value of collected solar heat. Thermal storage, on the other hand, becomes more difficult in these systems since water as a thermal storage medium necessitates the employment of costly pressure vessels. The hot thermal storage component separates two flow loops in this basic solar thermal cooling system. Heat is transferred from solar thermal collectors to the thermal storage through a solar heating flow loop. Heat is transferred from the thermal storage to the thermal cooling device through a thermal cooling flow loop. The thermal store is charged when the heat from the collectors exceeds the heat being used by the thermal cooling device. When the demand for heat from the thermal cooling device exceeds the amount of solar heat available, the thermal storage is depleted to meet the need. The thermal store in most solar cooling systems to date (see Section 3) utilizes a sensible heat storage medium that is the same as the liquid heat transfer fluid in one or both flow loops. Direct thermal storage is the simultaneous capture, transmission, and storage of heat. A distinct storage medium from the collector heat transfer fluid is used in an indirect thermal storage system, which incorporates some kind of heat exchange arrangement. The thermal store's operation and performance are clearly intertwined with the process flow arrangement/design of the whole solar cooling system. This is reflected in the thermal store's working temperature, which is determined by the thermal cooling mechanism. Absorption chillers, for example, are classified into three types depending on the temperature of the heat input needed to operate them. When choosing a solar collector and an appropriate storage material for solar cooling systems, the chiller's working temperature is obviously a crucial consideration. As a consequence, the typical solar thermal cooling flow system [3].

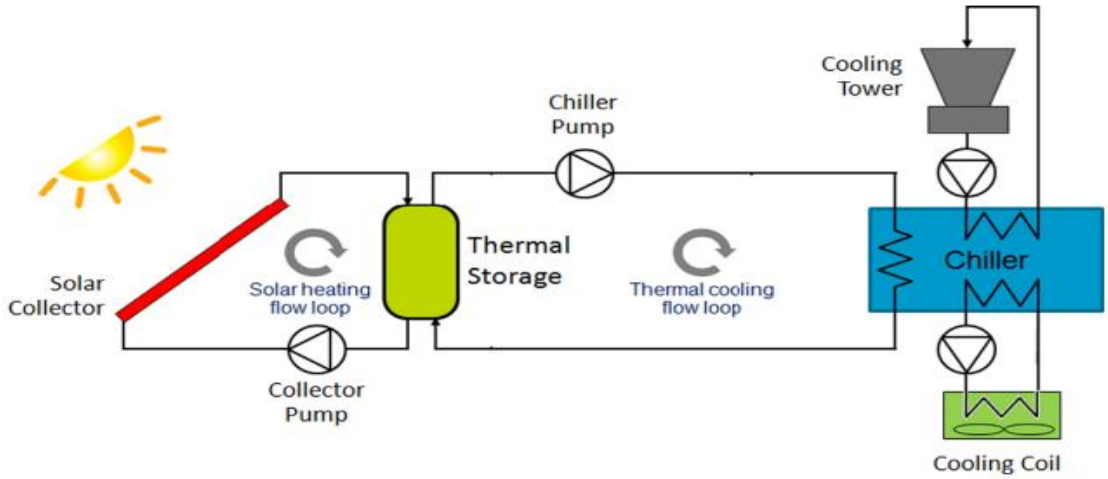

Figure 1: A Generic Solar Thermal Cooling System.

Frost protection, for example, may need an extra flow loop between the thermal storage and the solar thermal collectors placed outside. Alternatively, the possibility of high pressures may make using low volatility heat transfer fluids in a separate atmospheric pressure flow loop appealing. Additional heat exchangers, either external or internal to the thermal storage, are required for additional flow loops. Section 5 goes into heat exchange choices in more depth. A variety of application constraints/alternatives, such as the potential inclusion of potable hot water production and the optional use of gas as a backup heat source, may further affect the architecture. Figure 1 shows A Generic Solar Thermal Cooling System.

2. DISCUSSION

2.1.APPLICATION:

Only a few instances of latent heat storage in solar air-conditioning systems are available. As part of the IEA solar heating and cooling task force, laboratory prototypes for LHTES for solar heating and cooling were examined. They discovered that, in contrast to water, the storage density is significantly influenced by the temperature lift (temperature differential between tank top and bottom) in the storage tank. A laboratory pilot plant has been constructed at the University of Lleida in Spain to evaluate various TESSs and materials for high temperature solar air-conditioning applications with double effect absorption chillers. The facility consists of three parts: a heating system, a storage system, and a cooling system. In lieu of the solar collector and absorption chiller, an electrical boiler (24 kWe) and a dry cooler (20kWe) are utilized to supply heat input and remove heat from the storage system for testing reasons. With a phase change of approximately 170 1C, this facility was utilized to evaluate the performance of hydroquinone and D-mannitol as latent heat storage materials. In contrast to the hydroquinone material, testing revealed that during the heat storage discharge cycle, undesired sub-cooling (below the material freezing point) occurred for D-mannitol. The effect of two alternative thermal storage heat exchange designs based on finned and un-finned shell-and-tube TES was also investigated. A 17.6 kW PCM storage tank was developed and constructed based on these laboratory findings for use in an actual solar cooling facility in Seville, Spain. It was placed on the top of the Engineering School building at the University of Seville as part of a solar refrigeration system. Its primary purpose is to supply heat to the solar cooling system when the sun isn't shining. A cylindrical vessel with a tube bundle within makes up the design. The heat transfer fluid circulates within the tubes, which are arranged in a triangle pattern, and the PCM is housed in the outer tube portion [4].

2.2.ADVANTAGE:

Heat may be stored in the form of sensible heat, latent heat (which requires a phase shift in the storage substance), or reversible physic-chemical processes in the storage medium. While sensible storage dominates current installations, the decrease in space needed for the thermal store is an encouragement for alternative types of thermal energy storage. When storing 10 MJ of heat, shows the impact of storage material choice on the TES system volume. in 46 solar cooling systems. the picture and characteristics of a latent heat thermal energy storage system built in Seville, Spain. The assessment of a variety of additional thermo-physical and chemical characteristics of prospective materials is also required when determining a suitable material for a particular application. This section is an overview of storage material research that may be used for solar cooling. In a sensible heating process, the quantity of energy transferred to the storage media is proportional to the difference between the storage medium's final and starting temperatures, its mass, and its heat capacity. Sensible storage may take the shape of I a solid substance that is heated and cooled indirectly by a heat transfer fluid, or (ii) a liquid material in a storage tank [5].

2.3.WORKING:

Water is the most frequent substance utilized in sensible heat storage systems. Water is a useful storage medium for low temperature sun cooling applications (e.g. single stage absorption chillers and desiccant systems) because of its high specific heat capacity, broad availability, chemical stability, and cheap cost. The use of water as a sensible heat storage medium for high temperature applications. To handle water in a liquid condition, triple effect chillers with a heat input of 200 1C may need a storage tank and pipes built for 35 bar. The application was found to be appropriate for both concrete and castable ceramics materials. Concrete is especially appealing because of its reduced cost, increased strength, and ease of handling. A broad range of materials appropriate for high temperature solar power plants is described in the NREL study, together with the experience of prior thermal energy storage systems used to solar parabolic trough power plants. Salts in molten form are a possible option for sensible heat storage, despite their primary usage in phase transition applications. They are appealing because of their cheap price. Materials having an energy density ratio greater than 0.5 were chosen. Sandstone is the sole exception owing of its strong heat conductivity. The source has no information about the price. Materials with comparable energy densities to water (e.g. asphalt sheet) may be a good option for high-temperature storage (4 100 1C). In conclusion, owing to its thermal characteristics and low cost, water is the most appropriate option for single effect chiller applications. Materials like synthetic oil, concrete, and asphalt may be good candidates for double and triple effect applications.

Thermal storage system design, cooling system needs, and economic limitations would all influence the ultimate decision. Heat associated with phase change is stored in these materials. The amount of heat stored in these materials is related to the mass of the material, the percentage of the material that undergoes phase transition, and the heat of fusion of the substance. Phase change materials are the materials that are utilized to store latent heat (PCM). Solid–solid, solid–liquid, solid–gas, and liquid–gas are all examples of phase transitions. The first example is concerned with storing heat via transitions between various types of crystallization forms, and it is distinguished from the others by a low latent heat and modest volume changes [6]. Solid–liquid and liquid–gas transitions are coupled with large volume changes, resulting in system complexity and containment issues, making them unsuitable for TES applications. Although the latent heat of the solid–liquid phase transition is lower than that of the liquid–gas phase shift, the volume change is less. As a result, they have been extensively researched in recent years. The three types of phase transition materials utilized in latent heat thermal energy storage are organic, inorganic, and eutectic. Paraffins (organics), hydrated salts (inorganic), and fatty acids (inorganic) are the most widely used materials in practical applications. Metal alloys, on the

other hand, may be able to overcome the poor heat conductivity of solid organics and salts. The authors created a two-stage absorption chiller with a thermal energy storage system for a solar cooling facility. The temperature range was the first criterion: the solar cooling system's working temperature for the double effect absorption chiller had to be between 140 and 200 1C, with the latter being the maximum collector output temperature. The heat of fusion was the second choice parameter: As a reference point, a heat of fusion greater than 150 kJ/kg was selected. The authors next conducted a literature study and conducted experimental experiments to evaluate various materials, compiling a This method was used to choose D-mannitol and hydroquinone. Low heat conductivity is a common problem with many phase transition materials, such as sun salt (KNO3/NaNO3). When thermal conductivity is poor, the solid layer produced on the exterior during heat discharge may act as an insulator, preventing heat transmission from the inside molten PCM solidifying. Metal constructions composed of steel or stainless steel that serve as carriers are used. Within the PCM, there is a dispersion of high conductivity material, such as copper, silver, or aluminum particles. Materials with high conductivity and low density, such as carbon fibers and paraffin composites, are used. Metal foam (copper, steel, or aluminum) or porous substance like graphite is impregnated with high conductivity porous materials. The scientists examined several techniques and discovered that the metal foam technique is the most promising and appropriate strategy for increasing the thermal conductivity of a PCM in terms of cost, handling, and availability.

3. CONCLUSION

This paper provided an overview of thermal storage materials, storage systems, control methods, and design strategies that are applicable to solar cooling applications (across a variety of temperature ranges). The following is a summary of the major findings from this literature review. In the literature, there are many instances of operating/demonstration units of single stage absorption chiller based solar cooling systems. Water is used as the storage medium in all of these systems. Water is also used as a storage medium in a few installations of double effect absorption chillers. Thermal oil has also been described as a storage medium for double effect chiller systems. Concrete and asphalt, in addition to water and synthetic oil, are regarded as possible low-cost reasonable storage materials. This page has a long list of possible latent heat storage materials. They've been divided into three categories based on their appropriateness for single, double, and triple effect chillers. Salts have an excellent cost index but poor thermal conductivity values, as can be shown. Hydroquinone and D-mannitol, both of which have been tested in a pilot plant, have been studied as possible phase transition materials for double effect solar cooling systems. Storage materials based on phase change have not been explored for triple effect chillers. Area choices for collectors High collector specific area (m^2/kW chiller capacity) Low collector specific area (m^2/kW chiller capacity) Autonomous at full capacity (no back-up)solar heating and cooling system To control comfort and avoid on/off cycling, there is a large thermal storage. It is not recommended (poor comfort outcome) Single-stage full-capacity low-efficiency thermal chiller with gas backup To enhance solar percentage while reducing gas usage, a large thermal storage is needed. It’s not a good idea (high petrol prices/high greenhouse gas emissions).

Full-capacity, high-efficiency multi-stage thermal chiller with gas backup It is not recommended (less economic) To reduce heat losses and costs, a small thermal storage is used. Thermal chiller with backup vapor compression chiller of full capacity It is not recommended (less economic) Enough thermal storage to reduce on/off cycling systems that are based. As a result, a publicly accessible chemical database was utilized to find possible candidate materials. Due to their melting point, thermal conductivity, and energy density, metals (e.g. Sn) and metal alloys (e.g. Al-Sn) have a lot of potential. Their cost indices, on the other hand, are expected to be orders of magnitude greater than salts. The designs of hot water storage tank-based storage systems have

been examined. Some of these systems allow heat transfer fluid to be used directly in the tank, while others require a heat exchanger between the solar collector and the tank. The methods for improving and maintaining stratification in these tanks have been outlined. When constructing stratification-based storage tanks, the aspect ratio, placement of input and exit pipes, and mass flow rate are all essential factors to consider [7].

When charging and discharging the storage medium, latent heat based indirect storage systems utilize either packed bed storage or shell and tube heat exchangers. Unfortunately, there is little design experience with latent heat stores in solar cooling systems, with the bulk of latent heat system literature focusing on cold storage at low temperatures. Due to the complexity of the system and the fluctuating nature of the primary energy source, controlling the charging and discharging of the thermal storage during the operation of a solar air conditioning plant is difficult [8]. Although separate control of flows in the collector and chiller loops has historically been used to solve the control issue, look-ahead model-based control methods are starting to emerge in the literature. These methods may be implemented using current control theory tools and have the potential to provide more efficient operating schedules over longer periods of time. To size the thermal store for various applications, quasi-steady state mass and energy balance simulation tools (e.g. TRNSYS, INSEL) have been used extensively. Surprisingly, it does not seem that this has resulted in uniform "rules-of-thumb" sizing. According to a thorough study of the literature, this is due to the broad variety of applications being studied as well as variations in optimization goals.

For various application scenarios, a qualitative guide to storage design intent is proposed [9]. Key research gaps in solar air-conditioning thermal storage (issues for future study) identified by this review include: New phase transition materials (at 180 to 250 1C) are being developed to help reduce the size of thermal storage in high-efficiency, high-temperature solar cooling applications. The additional expense (relative to water) of phase change materials would be justified by the possible decrease in pressure vessel costs, code compliance, and thermal losses when compared to more typical low temperature single stage chiller systems. New sophisticated look-ahead controllers that can regulate the charging and discharging of the thermal storage depending on the building's anticipated need and the solar resource's predicted availability. These control techniques may be utilized to enhance sunlight fraction or provide better comfort assurance in self-contained solar thermal air-conditioning systems. The effect of an absorption chiller's thermal mass and dilution cycle on the minimum thermal storage capacity needed to allow the chiller's robust, mostly steady-state operation in solar air-conditioning applications. Solar cooling's ability to balance out power demand with thermal storage is being investigated in electrical system integration studies. Increased storage would be identified as a benefit to the whole energy system (which may not be immediately apparent from basic stand-alone building airconditioning studies). It would also offer insight into how the proportion of solar energy in the electrical system may be raised, eventually leading to a zero-fossil-energy grid [10].

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OVERVIEW OF THE PENETRATION RADAR TO TRACK GROUND

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ABSTRACT

Ground penetrating radar is a geophysical instrument that works on the theory of electromagnetic radiation. This method uses a radar pulse to image the Earth's subsurface. GPR is made up of three parts, one of which is the antenna, which houses both the transmitter and the receiver. When a radar signal penetrates into the ground and returns a revert signal after reaching an item, information about the utilities existing under the ground is given. High gain and broad bandwidth are two antenna characteristics that may be considered for deep penetration in GPR applications. The application utilized in this project is a geographic survey of the ground where we may locate utility pipelines such as electricity and water.This paper discusses about the twenty-first century, people may explore the deep ocean using underwater technology such as sonar, scuba diving, and other techniques, but mankind still has no clue what lurks beneath the earth's surface. To learn particular facts, one must either dig the soil or utilize the mining technique.

KEYWORDS:*GPR (Ground Penetrating Radar), GSSI (Geophysical Survey System, Inc.), SIR (System Incorporated Terasirch).*

1. INTRODUCTION

Deepocean exploration is also possible for humans utilizing underwater technology such as sonar, scuba diving, and other methods in the twenty-first century, although humanity still have no idea what lies under the earth's surface. To learn specific data, one must either excavate the soil or use the mining method to identify the soil information. Using electromagnetic radiation, we can penetrate the data up to 15 mm. Ground penetrating radar is one of the electromagnetic radiation-based techniques for studying the earth's knowledge. GPR techniques were originally developed for oil and gas exploration, but they are now being used in a variety of fields, including archaeology, environmental research, geotechnical and hydrological investigations, and so on [1].

Geotechnical is one of the applications that subterranean utilities can readily recognize. The antenna receives an electromagnetic pulse from the radar transmitting under the ground and the return signal since it employs an electromagnetic radiation technique. As a result, we can record the two-way travel time and amplitude of the signal [2]. The signal intensity is what determines the amplitude. The antenna is available in a variety of frequencies, depending on the application. Before constructing houses, malls, or structures, we may obtain a good philosophy of t by doing a GPR survey of the site. This technique provides us with information on underground utilities such as water pipelines, electric lines, sewage lines, metal pipelines, and gas lines, among other things. We can obtain a general notion of any piece of land using this surveying technique [3].

1.1 Ground penetrating radar (GPR);

GPR works by sending electromagnetic waves (in the range of 10 to 10 000 Hz) into the investigated material and receiving the reflected pulses when they pass through discontinuities. A discontinuity may be a border or interface between dielectrically dissimilar materials, or a subsurface item like a deboned or delamination. The type and position of the discontinuity may then be determined using the amplitudes of the received echoes and their associated arrival timings [4].

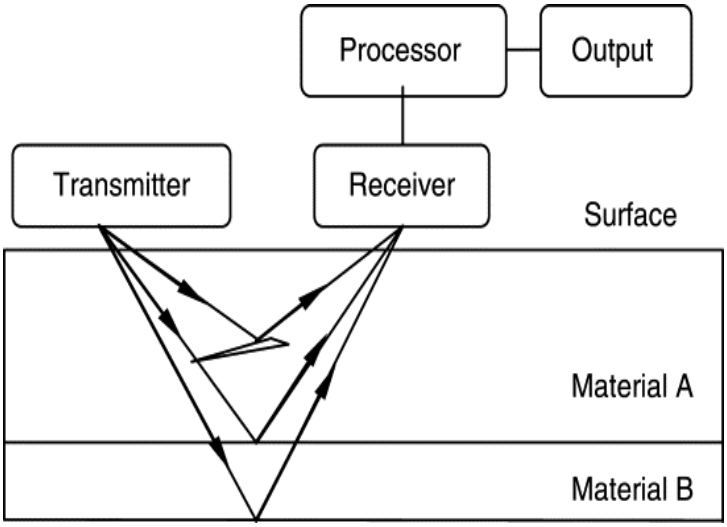

Fig 1: Principle of Testing With GPR System [5]**.**

GPR may now be utilized for subsurface condition evaluation in materials with thin layers, such as FRP composites, thanks to advancements in GPR technology, particularly the increased frequency of commercially available GPR antennas and improved data processing software. GPR waveform analysis may possibly aid in the detection of subsurface debones between the worn surface and the underlying FRP bridge deck, as well as delamination's inside the FRP deck's flanges.

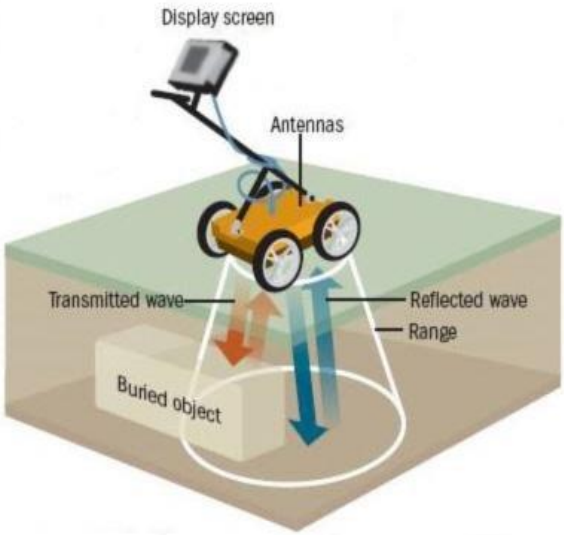

Fig 2: Penetration Radar [6]**.**

GPR has higher penetrating power than other non-destructive methods like infrared thermography, ultrasonic, or microwave, and can identify concrete flaws or deteriorations at larger depths. According to the findings of the literature study, a lower frequency GPR antenna (1 GHz) is unable to identify superficial flaws like deboning in FRP wrapped members, while a higher frequency antenna (2 GHz) can. A ground linked 1.5 GHz antenna, on the other hand, was found to have a greater penetration capacity, which is important for evaluating FRP bridge decking[7]. GPR is an effective technique for identifying water-filled debonings, however its efficacy in detecting air-filled deboning's in FRP wrapped concrete cylinders and FRP bridge decks (Dutta, 2006) is lacking. GPR (Ground Penetrating Radar) is a real-time NDT method that utilizes high-frequency radio waves to provide high-resolution data in a short period of time. This method employs electromagnetic waves that move at a particular speed defined by the material's permittivity [8].

Due to differences in electrical characteristics, velocities will vary depending on the kind of material and therefore produce responses at various times. A series of traces are gathered at specified locations along the survey line as antennas travel along it. The scans are then stacked on top of each other to create a profile of the region. A waveform generator, a single transducer with an emitting and receiving antenna, a signal processor, and a data storage/display device are the primary components of the GPR. For structural applications, several methods have been employed, including frequency modulation, synthetic pulse-radar, and pulse systems [6]. A full-scale railway track with sub-ballast, ballast, wood ties, and rails was built at the University of Massachusetts – Amherst to test the effects of fouling percentage, water content, and geotechnical indices on GPR survey findings (Fig. 3).

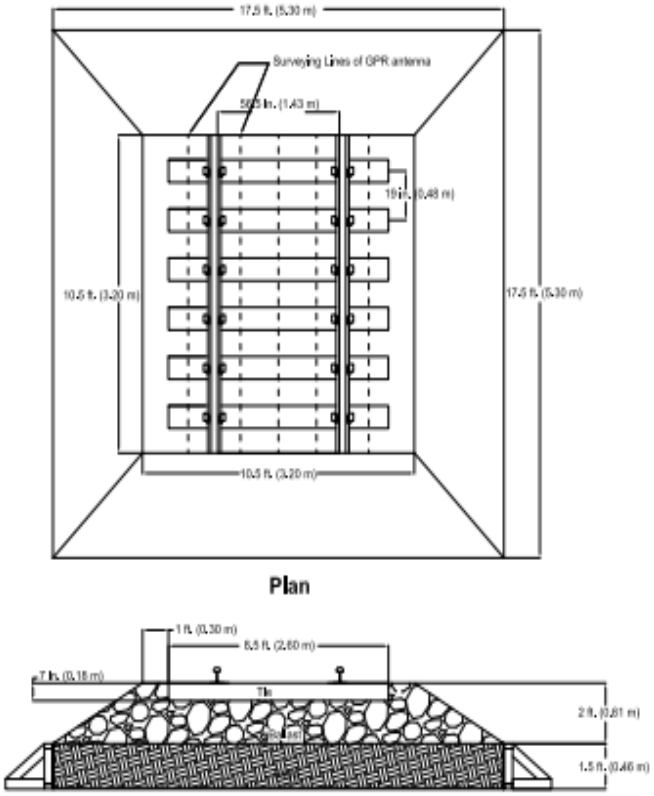

Figure 3: Schematic Plan and Section of a model track

Although all are accepted methods, the pulsed system method has been found to be the most accepted and used in most available equipment. GPR is most-commonly used for locating spacing and depth for reinforcing steel, posttensioning cables or anchors, measuring rebar cover, and mapping voids. With the growing availability and improvement of GPR processing software, research has found that it can be used as a subsurface condition assessment for FRP composites. GPR waveforms can now help detect voids inside the concrete. Compared to other nondestructive techniques, such as infrared thermography, ultrasonic or microwave, GPR offers more penetrating power and so can detect concrete defects or deteriorations at greater depths. Velocity (v) in the medium is given by the following equation:

v=cεr Where *c* is the velocity of electromagnetic waves in vacuum (=3 × 10^8 m/s) and ε_r is the relative dielectric constant of the propagation medium[9]. The depth of a subsurface interface or inclusion (*d*) can be obtained using the following equation: d=vt2 where *t* is the total round-trip time taken by the electromagnetic pulse to travel from the antenna to the subsurface feature and back to the antenna. Equations assumes that the radar antenna is placed on the surface of the test specimen and the same antenna transmits and receives the echo signal (pulse-echo mode). Since the waves attenuate as they propagate through a medium, it is customary to use linear or exponential gain (increasing with travel distance) during radar data acquisition[10]. The wave attenuation coefficient increases with antenna frequency and moisture content of the propagation medium (Halabe *et al*., 1993). While low-frequency antennas (15–900 MHz) are typically used for subsurface investigation in pavements and soils, higher-frequency antennas (1–2.5 GHz) are typically used in cases of concrete and composite structural components where the required penetration depth is much lower (few cm to 1 m). The higher frequencies offer shorter wavelengths and better resolution, so smaller defects can be detected [11].

LITERATURE REVIEW

Mario Quinta-Ferreira studies Ground Penetration Radar (GPR) offers a lot of potential in geotechnics, but it also has a lot of disadvantages. By enabling the gathering of field data in a fast and flexible way, this technique enables the connection between geological studies, geophysical characterization, mechanical exploration, and geotechnical zoning. The depth and accuracy of data gathering adapts easily to a wide range of conditions, from a few centimeters to many tens of meters, as well as the use of lower frequency antennas. This non-destructive, near-surface testing method may be used almost everywhere. The continuous data from the GPR complements the discrete and localized data from mechanical investigation. The use of direct mechanical examination and GPR imaging to validate local geological conditions allows for the confirmation of parameters obtained using different techniques, which, if verified, may allow for more accurate interpretation of areas and volumes. Under ideal conditions, the use of the GPR may greatly assist direct mechanical study, but interpretation must always be done with great care and based on a comprehensive knowledge of the site characteristics. The interpretation of the GPR is usually riddled with uncertainty.

The goal of the research was to increase the efficiency of geotechnical characterization by combining complementary techniques to reduce the cost and time required to perform geotechnical investigations while ensuring that the data obtained is suitable and sufficient for the desired goals. GPR was coupled with trenches and the Dynamic Probing Super Heavy (DPSH) test in a few case studies, allowing researchers to enhance the unique information of each technique while also taking the importance of each site's geology into account. In the geotechnical study for the rehabilitation of an ancient Villa, which required the construction of a small auditorium in the basement and an underground garage in the garden, the GPR and the DPSH successfully allowed to define the geotechnical zoning of the surface soils and the depth of the sandstone bedrock, as the local information obtained by the DPSH allowed to validate the GPR imaging. Hidden pipes and a subterranean water tank were also discovered using a GPR grid. GPR interpretation in karst areas may be challenging due to the uneven geological contact between the limestone and the residual soils inhabiting the dissolution zones. GPR imaging may frequently detect the layered structure and particle size variation in Aeolian sands, which can be verified by geological exploration and mechanical study. Aside from natural changes in the ground mass's electromagnetic properties, unexpected variables like tree roots, uncontrolled fill, or even previous excavations may make interpreting GPR data difficult [12].

Christopher Adam Senalik studies to detect objects in ground-penetrating radar (GPR) data, empirical mode decomposition (EMD) and dynamic temporal warping are employed (DTW). A total of two sets of wood specimens were evaluated. The first group consisted of laboratory-prepared Douglas fir (Pseudotsugamenziesii) wood pieces with known internal properties. The second set was made out of wood girders rescued from ancient Route 66 wooden bridges over an 80-year period. These two sets of specimens were scanned using the GSSI Subsurface Interface Radar (SIR) System 4000 with a 2 GHz palm antenna. Due to the presence of water, metal, or air inside the wood, GPR detected variations in dielectric constants (DC) throughout the scan route. The purpose of this research is to identify features and classify issues. The findings indicate that the techniques for presenting GPR data were effective [13].

DISCUSSION

This paper discusses about the twenty-first century, people may explore the deep ocean using underwater technology such as sonar, scuba diving, and other techniques, but mankind still has no clue what lurks beneath the earth's surface. To learn particular facts, one must either dig the soil or utilize the mining technique. We can penetrate the data up to 15 mm using electromagnetic radiation one of the electromagnetic radiation-based methods for investigating the earth's understanding is ground penetrating radar. GPR methods were first developed for oil and gas exploration, but they are now utilized in a wide range of disciplines, including

archaeology, environmental studies, geotechnical and hydrological investigations, and so on.GPR operates by delivering electromagnetic waves into the studied material (in the range of 10 to 10 000 Hz) and receiving the reflected pulses when they pass through discontinuities. A discontinuity may be a dielectrically different material's boundary or interface, or a subsurface object such a deboned or delamination. The amplitudes of the received echoes and their corresponding arrival times may then be used to identify the kind and location of the discontinuity. PR operates by delivering electromagnetic waves into the studied material (in the range of 10 to 10 000 Hz) and receiving the reflected pulses when they pass through discontinuities. A discontinuity may be a dielectrically different material's boundary or interface, or a subsurface object such a deboned or delamination. The amplitudes of the received echoes and their corresponding arrival times may then be used to identify the kind and location of the discontinuity. Velocities will vary based on the kind of material due to variations in electrical properties, and therefore generate reactions at different periods. As antennas move down the survey line, a series of traces are collected at certain places. After that, the scans are layered on top of one another to produce a profile of the area. The GPR's main components are a waveform generator, a single transducer with an emitting and receiving antenna, a signal processor, and a data storage/display device. Several techniques have been used for structural applications, including frequency modulation, synthetic pulse-radar, and pulse systems.

CONCLUSION

The complete procedure of identifying different utilities has been presented in this project. This procedure aids the client in locating different pieces of information under the earth. When a customer intends to develop buildings, malls, skyscrapers, and other structures without first learning about the underlying infrastructure, these utilities may be disrupted, causing major issues for the whole community. These GPR scans provide customers with information about the ground and assist them in constructing their structures in a well-facilitated location with utility pipelines. The most pressing issue we face today is water loss, which occurs when construction workers break water pipes without understanding what is underneath them. As a result, everyone is affected by water loss. In addition, the builder must pay a large sum of money to the government as a result of the loss. This effort will address the issue for the time being and in the future.

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AN OVERVIEW OF THE COMPUTERIZATION IN THE GAS LEAKAGE RECOGNITION

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ABSTRACT

If left undetected, because of any leakage from gases or smoke, a lot of harm can be done to humans as well as non-living objects. This can trigger explosions in factories, manufacturing and areas in the vicinity. In remote areas, such as vents, pipelines, caves, where it is difficult for humans to patrol and track any gas leakage during the day and night, there may even be instances of gas leakage. Human beings detect leakage by two ways, one is the sound caused by leakage and the other is the odor created by gas. But these two methods, all the time and for a long time, are not successful and realistic. In this paper, an automated robot was built to detect any leakage of gas or smoke in the field. It has two operating modes. One is the way to avoid any obstacles and the other is the way to follow a predefined path. It will then detect any leakage and send the data to the personnel concerned for further action.

KEYWORDS:*Gas Sensors, Robot, Gas Leakage, Obstacle Avoidance, Line Follower, Autonomous.*

INTRODUCTION

Because of their widespread use with examples such as cooking and industrial usage, the use of flammable gases such as liquefied petroleum gases, methane, propane, i-Butane is growing with each passing day. But because of the leakage, this causes many incidents to increase. Such situations can often occur in which the gases or smoke from the pipelines or other connecting points can leak. Only by their smelling ability can humans detect leakage of gases, but this is possible only after the gas particles have blended with air and their concentration is high. If the workers walk along the pipeline route and notices any leakage, it is possible to monitor leakage from gas pipelines manually. However, any leakage will not be noticed throughout the day or night since the allocated personnel may only inspect for leakage according to the established timetable and report the patrolling results. If a worker discovers a leak of any gas and the source of the leak, they will raise a query and inform the staff, however this method has many hazardous elements. This whole operation should be carried out by a robot that will take the

place of humans in order to allow for the detection of flammable gas, monitoring of the leaking site, and prohibiting people from entering the area.

As a result, the paper's main focus is on a robot that can do the following tasks:

1. Patrolling the gas pipeline automatically according to a predetermined timetable.

2. Tracking any gas leaks and determining their stage of leaking.

3. Issue a warning to individuals in the area as well as others who are worried.

4. Take note of the gas ratio and save the information on a micro SDD memory card[1].

The proposed robot can operate in line follower and obstacle avoidance modes, distinguishing it from other generic robots [3]. The robot's distinctiveness has been attributed to its dual working mode and small size, which allows it to be deployed in distant locations to detect gas or smoke. In the mode of obstacle avoidance, it has the capacity to avoid any kind of impediment in its path, allowing it to travel freely throughout. The data is then wirelessly sent to the server. This mode is utilized when there is a need to check for leaks in pipelines, gas lines, or vents.

Fig 1: Automatic Gas Leakage Detector [2]**.**

As a result, it is capable of both determining its path and wirelessly delivering the signal. Alternatively, in line tracking mode, it follows the specified black line and detects any gas leakage, sending the required signal to the receiving mode. This mode is utilized when the robot must follow a predetermined path and then look for any gas leaks in that direction while performing the test [4]. Designing process: The development process has been divided into three steps:

1. Robot component parts design
2. Designing robot hardware modules
3. Computer design

The robot was designed to fulfill the following functions. It will conduct regular patrols beside the gas pipeline according to a predetermined timetable, and will do so while following the line alongside the pipeline. The gas pipeline would then be monitored by maintaining a record of the gas concentrations [4]. If the gas concentration was greater than the normal amount, a ringing alarm would sound and a light emitting diode would glow. The data collected will be kept for future research. It would be able to take a step forward, turn left and right, continue ahead, and dodge the robot line that would follow. bb. b. b. b. b. b. b. b. b. b. A wheel pair is put on the back side for forward motion, while one wheel is placed on the front as the driver's balancer. Internal components, such as a microprocessor, were put inside, while external components, such as LED gas sensors, were mounted on the body [5].

A line sensor is placed in the bottom portion of the robot because it must travel down the line. For power, a rechargeable battery is installed at the back. Creating hardware circuits: The components include a driver for motor L298N for controlling the DC motor, an Arduino Nana, and a TCRT5000 line sensor, a MQ-2 gas sensor that can detect flammable gases, an RTC DS3231 timer, a liquid crystal display, and a Micro SD Modulus [6]. The primary signal and data processor is linked to all of these components. A gas sensor detects the presence of any combustible gas and transforms it to a voltage equivalent that is sent to the Arduino Nano. The line sensor detects the black line and delivers voltage-adjusted resistance, which the microprocessor uses to drive the DC motor. The concentration of gas data is shown on the LCD screen, after which the data is stored on the memory card, followed by a robot stop or LED turn-on and buzzing warning. The RTC module is utilized for data recording and patrol scheduling. Combustible, flammable, and poisonous gases, as well as oxygen deprivation, may all be detected using gas detectors. This kind of gadget is extensively utilized in industry, and it may be found in places like oil rigs to monitor manufacturing processes and new technologies like photovoltaics. They may be used to battle fire [7].

LPG gas is detected using semiconductor sensors. The sensor is a MQ6 semiconductor sensor. The MQ-6 gas sensor's sensitive substance is SnO2, which has a reduced conductivity in clean air. The sensor conductivity rises in tandem with the increasing gas concentration when the target flammable gas is present. The MQ6 gas sensor offers a high sensitivity to Propane, Butane, and LPG, as well as a fast reaction time to Natural Gas. The sensor can detect a variety of flammable gases, including Methane; it is low-cost and appropriate for a variety of applications. The MQ-6 can detect gas concentrations of 200 to 10,000 parts per million. The output of the sensor is an analog resistance. The block diagram of the gas leakage detection and warning system is shown in Figure 1.

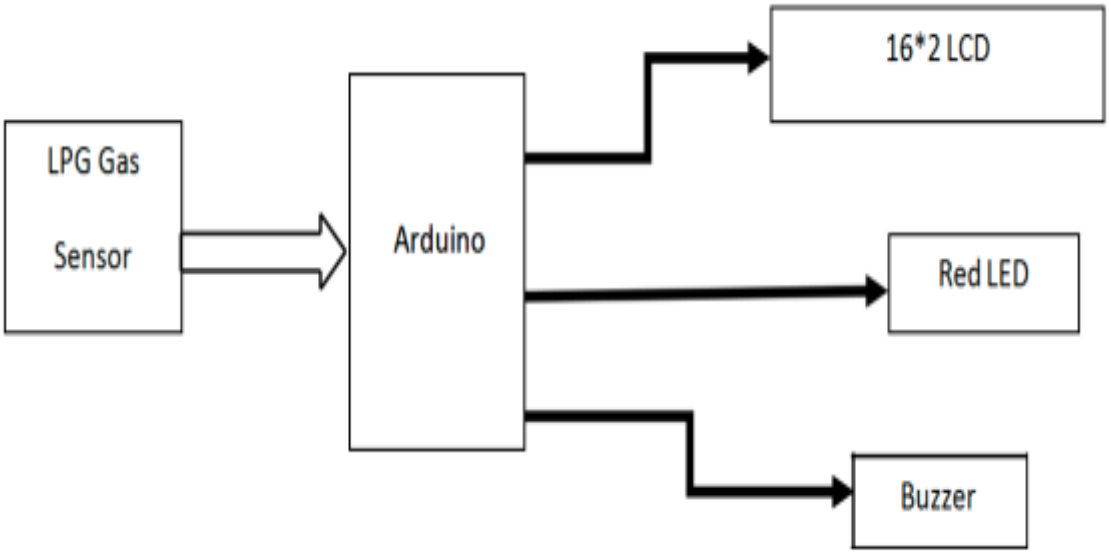

Figure 1. Block Diagram of Gas Leakage Detection and Alert System.

The Arduino UNO R3 and the MQ-6 gas sensor are used in this setup. If the sensor detects gas in the environment, it will produce digital output 1; if no gas is detected, it will output digital output 0. The sensor output will be received as a digital input by Arduino. If the sensor output is high, the buzzer will begin to tune, and the LCD will display "Gas detected: Yes." The buzzer will not tune if the sensor output is low, and the LCD will display "Gas detected: No." The buzzer is usually composed of a number of switches or sensors connected to a control unit that determines which button was pressed or whether a preset time has elapsed, and usually illuminates a light on the appreciate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound, and usually illuminates a light on the appreciate button or control panel. The following hardware components are needed for the construction of a sensor-based gas leakage detection and alarm system. The necessary hardware opponents, quantity, and pricing in Bangladeshi Taka are shown in Table 1. The gas detector is extremely inexpensive, costing just 917 BD Taka. The gadget is lightweight, portable, user-friendly, and efficient, with multi-functional capabilities. Figure 2 depicts the key components required for the design of a gas leakage detection and alarm system.

Table 1. List of Required Hardware Opponents, Quantity and Price in Bangladeshi Taka.

Equipment	Quantity	Price (BDT)
Arduino Uno R3	1	420/-
MQ-6 LPG gas sensor	1	160/-
16*2 LCD	1	124/-
Buzzer	1	15/-
Male to male/female wire	40	60/-
9 V Battery	1	40/-
Gas Lighter	1	35/-
10 K Variable Resistor	1	8/-
Mini Breadboard	1	55/-

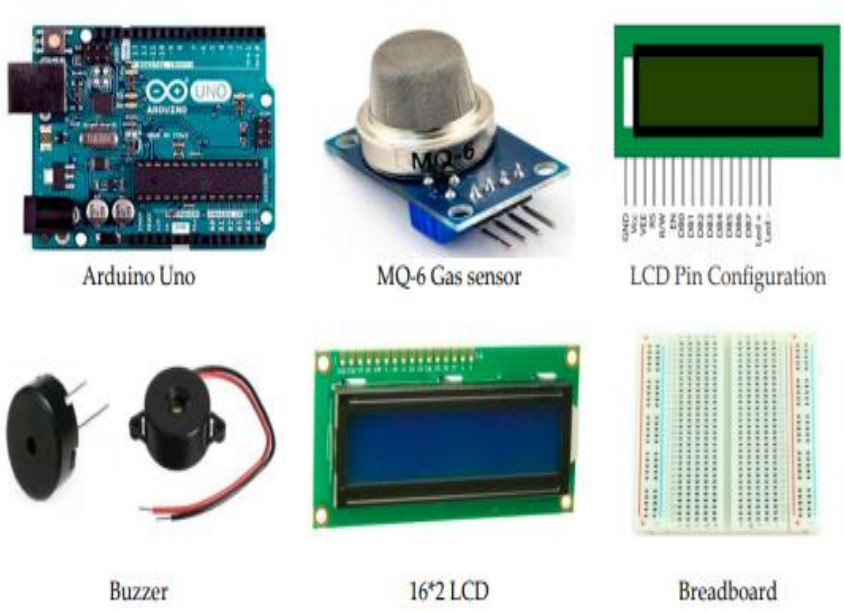

Figure 2. Some Important Components that are needed to Design the Gas Leakage Detection and Alert System.

LITERATURE REVIEW

Writers HeruSupriyono and Ahmad NurHadi discussed the need for a wheeled robot to detect leaking of any gas or smoke in the robot's proximity. Other features have been added, such as line tracking and data transmission and storing to a micro SD card. Souvik Manna, Suman SankarBhunia, and Nandini Mukherjee addressed how to determine air quality as a consequence of increasing human-induced activities. The study monitored air pollution produced by automobiles, and IoT was suggested, coupled with a mix of electrochemical hazardous gas sensors and wireless sensor networks. The authors, Meer Shadman Saeed and NusratAlim, have proposed a new method for an autonomous robot to detect gas leakage that can operate in both obstacle avoidance and line mode using ultrasonic sensors and an infrared sensor. After then, a wireless signal is transmitted. Hiroshi Ishida, Keita Yoshikawa, and ToyosakaMoriizumi described an ultrasonic wave-based anemometer that could measure air flow direction in three dimensions and was surrounded by six semiconductor-based 3-D sensors. L298N engine driver, Arduino engine driver, Arduino engine driver Nano, Direct current motor, TCRT5000 line sensor, MQ-2 gas sensor, clock generator and RTC DS3231 timer, micro SD module, liquid crystal display, buzzing alarm, light emitting diode, and a battery as a power source are the various elements used to make the robot.

DISCUSSION

These paper discuses about the use of flammable gases such as liquefied petroleum gases, methane, propane, i-Butane is growing with each passing day. But because of the leakage, this causes many incidents to increase. Such situations can often occur in which the gases or smoke from the pipelines or other connecting points can leak. Only by their smelling ability can humans detect leakage of gases, but this is possible only after the gas particles have blended with air and their concentration is high. If the workers walk along the pipeline route and notices any leakage, it is possible to monitor leakage from gas pipelines manually. The robot was designed to fulfill the following functions. It will conduct regular patrols beside the gas pipeline according to a predetermined timetable, and will do so while following the line alongside the pipeline.

Keeping a record of the gas concentration would subsequently be used to monitor the gas pipeline [. If the gas concentration was greater than the normal amount, a ringing alarm would sound and a light emitting diode would glow.

A gas sensor detects the presence of any combustible gas and transforms it to a voltage equivalent that is sent to the Arduino Nano. The line sensor detects the black line and delivers voltage-adjusted resistance, which the microprocessor uses to drive the DC motor. The concentration of gas data is shown on the LCD screen, after which the data is stored on the memory card, followed by a robot stop or LED turn-on and buzzing warning. The RTC module is utilized for data recording and patrol scheduling. Combustible, flammable, and poisonous gases, as well as oxygen deprivation, may all be detected using gas detectors. This kind of gadget is extensively utilized in industry, and it may be found in places like oil rigs to monitor manufacturing processes and new technologies like photovoltaics. They may be used to battle fires. The Arduino UNO R3 and the MQ-6 gas sensor are used in this setup. If the sensor detects gas in the environment, it will produce digital output 1; if no gas is detected, it will output digital output 0. The sensor output will be received as a digital input by Arduino. If the sensor output is high, the buzzer will begin to tune, and the LCD will display "Gas detected: Yes." The buzzer will not tune if the sensor output is low, and the LCD will display "Gas detected: No." The buzzer is usually composed of a number of switches or sensors connected to a control unit that determines which button was pressed or whether a preset time has elapsed, and usually illuminates a light on the appreciate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound, and usually illuminates a light on the appreciate button or control panel.

CONCLUSION

The primary goal was to build a robot that could operate in two modes: one to avoid any obstacles in its path, and the other to follow a line and detect any gas leaks. As a result, a robot model for wheels was created to detect any gas escape. A gas-sensing device was also installed inside the wheel. The programming for carrying out all of the activities were shown in a flowchart for both modes of operation, and the relevant data was transmitted to the micro SD through the module if the ratio value was less than six. At a minimum of 5.92 cm, there is an abrupt halt, as indicated in Table 1. The robot's effectiveness has risen as a result of its two modes of operation, and it will be able to gather and transmit information about any gas or smoke leaks from a number of remote locations. An integrated device may be placed within the robot for future modifications that will detect and record the parts per million concentrations of the gas leaks detected. Other improvements, like as temperature sensors or wireless data transmission, may be made to improve the wheeled robot's capabilities.

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THE NEW MATERIALS OF THE PERMANENT MAGNETS: A VIEW

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ABSTRACT

Electric machines with permanent magnets are now being used in an increasing number of design methods. It is most importantly related to the development of novel long-lasting magnet materials (for example, Nd-Fe-B, a unique anisotropic combination) with high attractive exhibitions and relative ease of use. This research looks at contemporary permanent magnets. The attractive, warm, and mechanical characteristics of everlasting magnets, as well as their usefulness, are discussed in this article. This article also looks at places where everlasting magnets are used in many design fields.

KEYWORDS:*Permanent Magnet, Magnetic Materials, Alloys, Sm-Co, Nd-Fe-B, Magnetic Parameters, Magnetic Properties.*

INTRODUCTION

Magnetic materials are necessary for the world's people to have a good quality of life. Many of the gadgets we take for granted are made possible by them. The rising quality of life of people all over the world is posing raw material supply problems and spurring industrial innovation. We'll go through the basics of magnetic materials and how powder metallurgy plays a role. To comprehend the fascination with magnets, it's essential to go back at their history and identify what makes one magnet superior to another. We'll take a brief look at the series of events that led to the discovery of rare earth magnets, the most powerful magnets presently accessible. Then we'll go through a few magnet-related applications and why they're so essential to our economy, our way of life, and the fundamental foundations of our technology. Finally, we'll discuss the difficulty of producing enough of these strong magnets, as well as research into even better materials.

Future technologies for an electric and sustainable society will need a high level of material awareness. Several materials are thought to be essential for long-term sustainability. The effect of the rare earth element (REE) business on the environment may be seen at many stages of the process, including mining and refining. In the mining sector, the effect of other minerals found in the same deposit locations may be more important than the REEs themselves. Emissions may occur during milling, separation, or subsequent stages of processing the material into an usable metal.

Line I depicts the dynamic evolution of material characteristics of ferrite magnets used in latches.

Line 2 consists of magnetic Alnico alloys (Al-Ni), which are used in radio and television equipment.

Lines 3 and 4 relate to new types of magnetic materials that have been created using rare-earth metals: Sm-Co line 3 and Nd-Fe-B line 4 [1].

Figure 1 shows that the magnetic energy of samarium magnets is six to ten times greater than that of ferrite magnets. In reality, this implies that neodymium magnets with size comparable to an egg may cause finger shattering. That is the mechanical forces that are produced. Power, coercive power, heated solidity (up to 200 °C), and anti-consumption solidity Sintered magnets have a thickness of up to 8.5 gran/centimeter and a progress temperature of 700 'C. These characteristics indicate that Sm-Co is suitable for use in high-temperature or high-consumption environments.

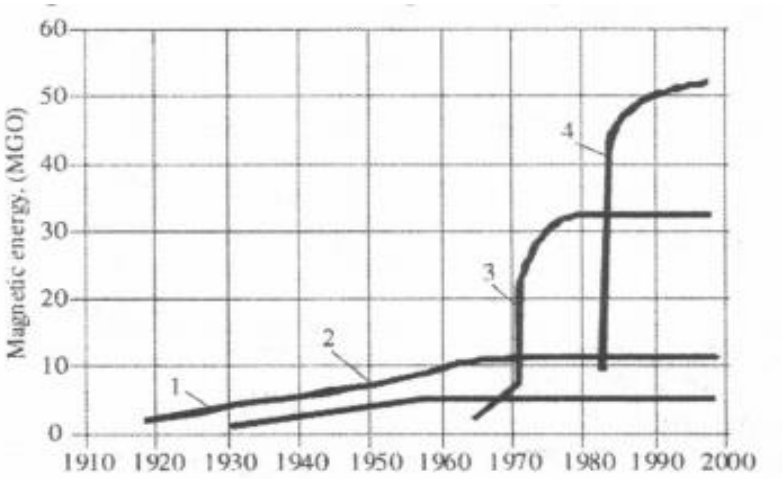


Fig 1: Shows That Behavior of Permanent Magnets Has Revolution Changes at Last Years

Direct alloying of initial components in a vacuum enlistment stove yields appealing mixtures with his characteristics [3]. Bullions bucks and smashes to a micron's worth of material. Magnets are ejected from a given residue in a variety of forms. Cakes made from stock material are baked at temperatures ranging from 1000 to 1200 degrees Celsius. The next item is mechanical handling, which includes hammering. Next, consider the benefits and disadvantages of various types of appealing materials. Strong mechanical strength, appealing characteristics strength across a broad temperature range, and high immersion force are the main areas of interest for alnico. These magnets, however, have very low coercive force. Ferrite materials have a strong coercive power, but they are also short and difficult to prepare. Similarly, a temperature has an effect on the attracting characteristics of such magnets [4].

As shown in Figure 1, there is a current focus in the area of PM research to bridge the performance gap between ferrite and RE magnets. It is proposed that a new magnet with an acceptable price/performance ratio of not more than approximately 1 $/J would be economically

efficient. A material with such characteristics may improve the performance and reduce the weight of existing ferrites-based devices, as well as lower the cost of RE magnet-based systems. Currently, bonded RE magnets, which are composites with PM powder incorporated in a plastic matrix, may cover the gap to some extent but at a significant cost. One way to bridge the gap between ferrites and NdFeB is to substitute less costly components for Nd. The cost-to-performance ratios of Ce-substituted NdFeB and SmCo compounds and alloys have been studied, and they show promise. Ce is a rare earth metal that makes up 66 parts per million of the earth's crust, compared to 41 parts per million for Nd. Uncommon earth magnets dependent on S m-Co composites have great attractive qualities (high immersion power and coercive power), warm strength and insusceptibility of consumption, moreover. The fundamental impediments are significant expense of a samarium and cobalt and thusly wide application of Sm-Co magnets is badly arranged. As of now, the most viewpoint sintered lasting magnets is Nd-Fe-B.

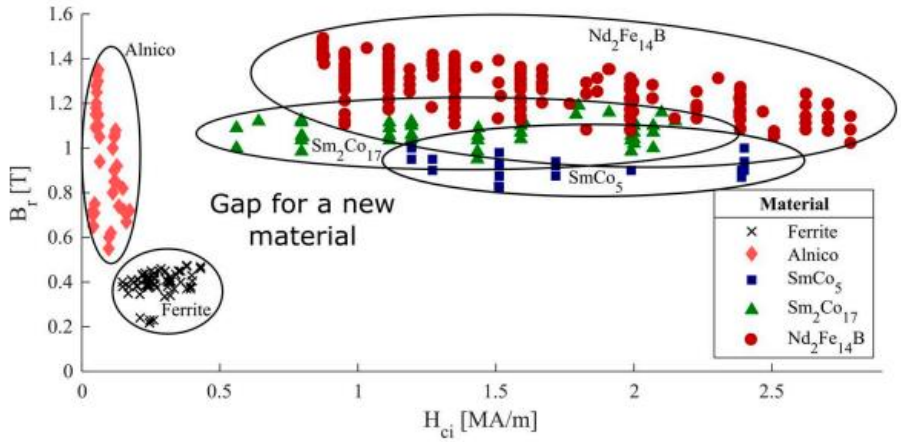


Figure 2. Different PM Materials Available On the Market and Their Properties, Illustrating the Gap between Ferrites and Rare-Earth (RE) Magnet.

To begin with, these magnets have most noteworthy BHmax and this worth don't reach limit.

Lasting magnets, compares powers, normally for regular machines and components (for example handfuls and hundred kilograms). At present in our nation, creation of uncommon earth magnets leaves out a research center stage and this creation are grown quick rate on premise of a adaptable innovation in a years ago. These days, such magnets are accessible for clients. Information of 000 "Chimcomplect" shows that lasting magnets Nd-Fe-B has special boundaries of qualities/cost. This clarify quickly a development of creation and presentation in different zones of designing such magnets [5].

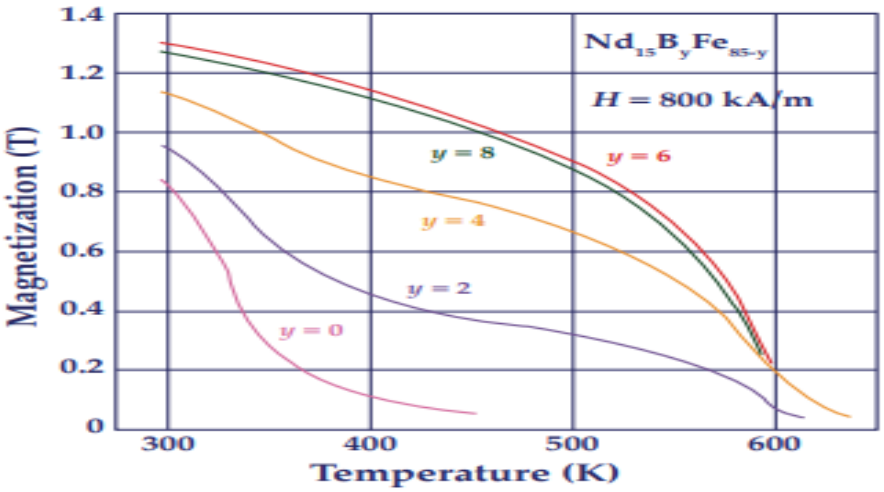
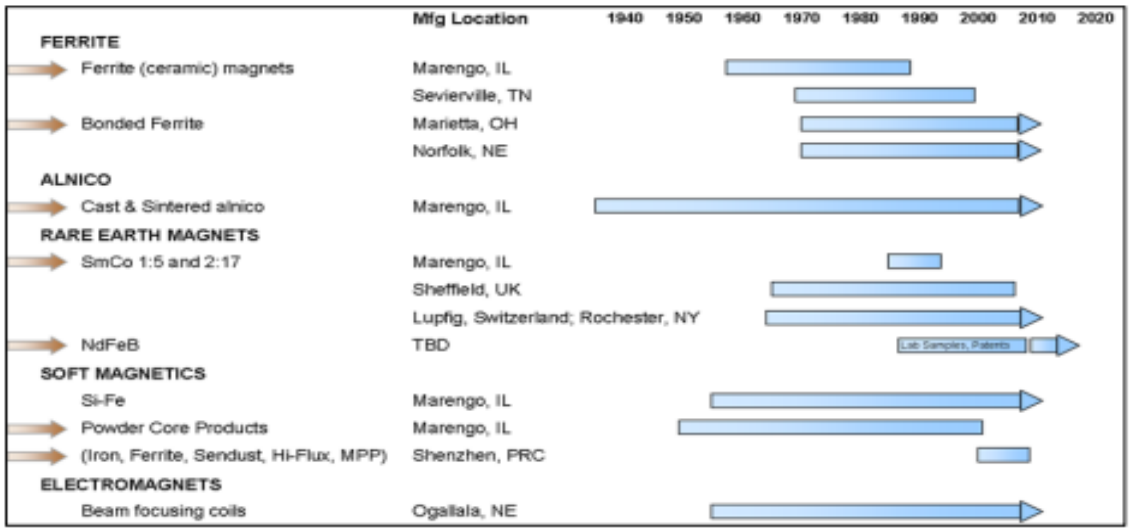


Figure 3: Magnetization vs temperature curves for H = 800 kA/m on five alloys containing different percentages of boron in Nd15ByFe85-y system.

The magnetization versus temperature graphs for Nd15ByFe85y with y = 08 are shown in Figure 2. With rising temperature, the magnetization of the Nd15Fe85 binary alloy, which has around 0.8 T at room temperature, falls to a very tiny value at about 400 K. The Curie temperature of the NdFe alloy was predicted to be about 310 K based on a low field experiment. The alloy's magnetization rises as the amount of B added increases, peaking at approximately 6 atoms B. The development of a tetragonal phase with a high Curie temperature causes this rise. The Curie temperature of this phase was found to be 585 K using low field measurements. Arnold has amassed a vast knowledge base in a variety of materials over the past 70 years, including but not limited to those shown in Figure 1. Powder metallurgical manufacture is used to make the goods with tan arrows to the left. (Keep an eye out for these arrows; they'll be used throughout the text.) Arnold's product line-up and production sites have evolved as goods and markets have changed. Arnold has a unique insight and perspective on the magnetics sector because to his vast knowledge base.



REVIEW OF LITERATURE

Among all the papers published in the area of permanent magnet materials, Sergey Lutz discusses the use of unusual earth magnets to create tiny size and amazing devices with enduring

magnets in a paper titled "a review of modern materials of permanent magnets by Boris Bochenkov." The demand for long-lasting Nd-Fe-B magnets from Russian manufacturers is consistently increasing by 25-30%. In comparison to conventional ferrites, alnico, and other materials, the fundamental piece of leeway of magnets Nd-Fe-B and Sm-Co consists in great attractiveness of material characteristics at small scales. New types of magnets have more appealing characteristics while maintaining their size. It's worth noting that force power or tractive effort boosts recruiting appeal. On the other hand, it reduces measurement and weight while maintaining the force of the hardware. Using extraordinary magnets may sometimes result in a significant reduction in energy consumption. It's worth noting that force power or tractive effort increases the appeal of enlisting. On the other hand, it reduces measurement and weight while maintaining the force of the hardware. The use of ground-breaking magnets may sometimes result in a reduction in energy consumption. In the year 1970, an Alloy Sm-Co broad appears on the market. Sm-Co has a high immersion rate these days. Quite likely the most advantageous position consists of such materials in comparison to other appealing materials with relatively little effort. These materials also have a high appealing progress temperature, ranging from 160 to 170 degrees Celsius. Nonetheless, Nd-Fe-B magnets with an operating temperature of 200 °C are now available. This allows them to be used in electric engines with long-lasting magnets [6].

DISCUSSION

This paper discusses about the mechanical forces that are generated Power, coercive power, heated solidity (up to 200 °C), and anti-consumption solidity are all characteristics of this material. Sintered magnets may be up to 8.5 gran/centimeter thick and have a progress temperature of 700°C. Sm-Co is suited for usage in high-temperature or high-consumption settings based on these properties. In a vacuum enlistment stove, direct alloying of starting components produces attractive mixes with his properties. Bullions bucks and crushes material down to a micron's value. Magnets are expelled in a number of ways from a given residue. Temperatures ranging from 1000 to 1200 degrees Celsius are used to bake cakes manufactured from stock material. Mechanical handling, which includes hammering, is the third item on the list. Next, think about the pros and drawbacks of different attractive materials. The primary areas of interest for alnico are its high mechanical strength, attractive features strength over a wide temperature range, and strong immersion force. These magnets, on the other hand, have a very weak coercive force. Ferrite materials have a high coercive strength, but they're also short and tough to work with. Similarly, the attracting properties of such magnets are affected by temperature.

Uncommon earth magnets based on Sm-Co composites offer a lot of appeal (high immersion and coercive power), as well as warm strength and resistance to consumption. The main obstacles are the high costs of samarium and cobalt, which makes widespread use of Sm-Co magnets difficult. Nd-Fe-B is now the most widely used sintered long-lasting magnet. To begin with, these magnets have the highest BHmax, and this value does not exceed a certain limit. Magnets that last, compare powers, and are often used in ordinary machinery and components (for example handfuls and hundred kilograms). Currently, in our country, the production of rare earth magnets does not take place in a research center, and this production has expanded at a rapid pace as a result of a flexible invention a few years ago. Clients may now get their hands on such magnets. The data from 000 "Chimcomplect" reveals that long-lasting magnets Nd-Fe-B have unique quality/cost limits. This clarifies the evolution of invention and presentation in many design zones, such as magnets, rapidly.

CONCLUSION

After considering attractive, warm, and mechanical characteristics, it is reasonable to conclude that magnets made of rare earth elements are usually appealing. High-energy sintered magnets Nd-Fe-B are now being considered for use in the rotor of an electric motor. Furthermore, this study demonstrates that Sm-Co is suitable for use in high-temperature or high-consumption environments. Currently, take notice of the automobile industry's capacity to create expansions. The underlying problem in the automobile business is the ineffective presentation of new materials and technological advances. As a result, a requirement direction entails using today's appealing elements and advances. To begin with, it is linked to a large number of electromagnetic devices (ranging from 50 to 100). Controllability, economy, comfort, and various machine limits are all characteristics of this device. It's also worth noting the increase in power from 2 kW to 20-50 kW, which allows for the use of new amazing devices for supply management and monitoring. In this vein, global manufacturers are switching to a two-level voltage system (14 and 42V or 12 and 36V). Increased control requests for new appealing materials and new innovations of appealing materials (for instance: the multifunction starter, generator and so forth).

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GENDER EQUALITY: SOME FEATURES OF INTERNATIONAL AND NATIONAL REGULATION

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ABSTRACT

The article discusses the issues of legal regulation of equality of men and women in all spheres of life in the Republic of Uzbekistan on the basis of the norms of international and national legislation, which were carried out on the basis of the analysis of documents and research of international organizations, as well as the works of domestic and foreign scientists, using a set of methods: historical, comparative and others. The issues of the existing inequality of men and women are considered on the basis of a social-constructivist approach; in the interactions of people in public space; when considering practical problems, in particular, the gender division of labor, the representation of women in power structures. Theoretical proposals were made to improve the legal regulation of gender equality in the Republic of Uzbekistan on the basis of international and national legislative acts.

KEYWORDS:*Gender, Gender Equality, Gender Policy, Gender Identity.*

I. INTRODUCTION

In the Republic of Uzbekistan, a well-thought-out, legally defined gender policy, which represents measures of a legal, organizational and institutional nature taken by government agencies to eliminate the inequality of floors, achieve specific goals to ensure the actual or fundamental equality of women and men [1]. The term "gender" as a social aspect of the relationship between women and men, which manifests itself in all spheres of the life of society, including politics, economics, law, ideology, and culture, education, and science, education, and culture, education, and science, education, and culture, education, and science [1].

There is a well-established definition of gender affiliation as a set of signs of a person who determine its belonging to men either to women, mainly in cultural and social terms. Gender belonging is revealed through the roles defined by the Society, learned and expected models of behavior that are associated with men and women. When they talk about sexuality, they usually mean gender inequality - the conditions under which women and girls have fewer opportunities only because of their gender affiliation. However, the term "gender activity" also refers to boys

and men who are equally defined as such on the basis of the rights and social roles that the society has gone.

Unfortunately, humanity will have to go through a long way to achieve full equality of men and women in terms of their rights and opportunities. Legal protection against home sexual violence is deprived of over a billion women around the world. The gap of remuneration on the basis of sex is 23 percent in the world as a whole and comes to 40 percent in rural areas, and the importance of unpaid work that many women perform is not recognized. The share of women in national parliaments on average is less than a quarter, and in the board of directors - and less. Therefore, it is important to end with gender-based violence in all its manifestations, to ensure equal access of women of women and girls, men and boys to education, health care, economic resources and create equal opportunities to participate in political life. It also concerns employment opportunities in general and leadership positions.

Although women around the world have been conducted many studies proving that they do not lag behind men in terms of intellectual development and abilities, in many countries to women still do not belong as equal. Girls and women do not get the same rights, opportunities, responsibility and selection, which are considered to be inherent in men and boys from birth. Therefore, the consideration of the legal regulation mechanism, as well as the proposal of theoretical provisions on the improvement of legal regulation of gender equality on the basis of international and national legislation shows the relevance of the topic of this article.

II. Research Methodology.

In the course of the study, along with the general scientific dialectical method of knowledge, also part-scientific research methods were used - systemic, logical, comparative law.

III. Literature Review

In the Republic of Uzbekistan, the work of the legal regulation of gender equality is devoted to the work of Narbaev, because [2], Ganiyeva G. J. [3,4], Memecheva L.A. [5] and other authors who reviewed the issues of gender equality and the role of women in society. But in these works, gender equality issues were considered in the context of participation in the socio-political and economic life of the Republic of Uzbekistan. A comprehensive study on the legal regulation of gender equality on the basis of international conventions and agreements, as well as the laws of the Republic of Uzbekistan, was not conducted.

The issues of regulating gender relations of relations are considered in the works of foreign scientists, such as Chicalov I. R. [6], Sazds, E. A., Temkin A. A. [7], Andreeva G.M. [8], Burlin Sean [9], Vorontsov D. V. [10,11], Shevchenko L. A. [12], Kathy Davis, Mary Evans, Judith Lorber [13].

IV. Discussion and Analysis

Gender inequality is maintained in both the economic and political spheres. What topical issues are considered in scientific research of the existing inequalities of men and women at the present stage? First, the problem of creating a gender in the framework of the socio-constructivist approach. Secondly, the production of gender differences in the interactions of people in the public space. Third, practical issues: gender division of labor, women's representation in the structures of the government, the emerging structure of sexual and emotional relations, historical changes in structural models of behavior. The basis of these studies is to search for methods to eliminate inequality in the position of men and women in social practice and in the family.

The directions of such search are determined by international legal instruments on human rights, among which, first of all, be called the Charter of the United Nations. Among the objectives of the UN, stated in Article 1 of the Charter, it is proposed to "carry out international cooperation ...

In the promotion and development of respect for human rights and the main freedoms for all, without distinguishing races, gender, language and religion" [14].

The historical universal declaration of human rights, adopted by the General Assembly on December 10, 1948, confirmed that "all people are born free and equal in their dignity and rights" and that "every person must have all the rights and all the freedoms set forth in this Declaration without which It would be no difference in relation to race, religion or other position "[15].

In 1979, the General Assembly adopted the Convention on the Elimination of All Forms of Discrimination against Women (CED), which is often referred to as the International Bill on the Rights of Women. The 30 articles of the Convention gives a clear definition of the concept of discrimination against women and is proposed for an agenda for action at the national level, designed to put an end to such discrimination. The Convention considers culture and tradition as the influential forming of gender roles and family relations, as well as the first human rights treaty confirming the reproductive rights of women [16].

Five years after the conference in Mexico City, the Second World Conference on Women took place. The action program adopted on its outcomes contains a call to adopt more decisive measures at the national level to ensure the rights of women in possession and disposal of property, as well as rights regarding the inheritance, guardianship and loss of citizenship.

In 1985, the World Conference was held in Nairobi to review and evaluate the achievements of the decade of United Nations women: equality, development and peace. This event was characterized as "the birth of global feminism." Conscious that the goals of the conference in Mexico City were not fully achieved, representatives of 157 participating countries adopted Nairobian promising strategies in the field of improving the status of women for the period up to 2000. This document brought a gender aspect to a new level, proclaiming that it should be taken into account when considering all issues. The Fourth World Conference on the Status of Women, held in 1995 in Beijing, became another step forward from the moment of the conference in Nairobi. The Beijing Declaration and Action Platform confirms the commitment to specific actions to ensure the observance of women's rights.

On July 2, 2010, the Delegates of the UN General Assembly unanimously voted for the creation of a unified United Nations structure responsible for the acceleration of progress in achieving the objectives of the Organization related to gender equality and the empowerment of women. The new UN structure on the issues of gender equality and the empowerment of women called "UN-Women", united four divisions of the World Organization: the United Nations Foundation for Women's Development (UNIFEM), a department for improving the status of women (aux), office Special adviser to gender issues and improving the status of women and the International Research and Development Institution of the UN to improve the status of women (Munic).

Currently, all UN efforts are aimed at achieving recently adopted sustainable development goals (SDGs). In each of the 17 sch, women are assigned an extremely important role, and many tasks are directly aimed at recognizing women's equality and contribute to the expansion of their rights and opportunities both as a goal and as its achievement. So purpose number 5 directly consists in "providing gender equality and empowering all women and girls."

One aspect of the implementation of gender equality is to eliminate violence against women. The UN system still pays special attention to the issue of violence against women. In 1993, the General Assembly of the Declaration of Eradicating Violence against Women is determined by the definition of violence against women and a clear statement of rights to ensure the eradication of violence against women in all its forms [17]. The Declaration reflected the determination of

states to fulfill its obligations and the commitment of the international community as a whole to efforts to eradicate violence against women.

International Women's Day is celebrated on March 8. On this day, women are noted, regardless of national borders or ethnic, linguistic, cultural, economic and political differences. The idea of holding an international women's day first emerged at the beginning of the twentieth century, when an industrially developed world experienced a period of expansion and shocks, demographic boom and the appearance of radical ideologies.

To ensure compliance with the rights of women around the world, many States will have to make appropriate changes to national legislation. The standards ensuring the equality of men and women are enshrined in the standards of the Constitution of the Republic of Uzbekistan, the Civil Code of the Republic of Uzbekistan, the Family Code of the Republic of Uzbekistan, the Labor Code of the Republic of Uzbekistan and a number of other laws and regulatory legal acts.

Special laws adopted, ensuring the equality of men and women - the Law of the Republic of Uzbekistan "On Guarantees of Equal Rights and Opportunities for Women and Men" and the Law of the Republicof Uzbekistan "On the protection of women from oppression and violence."

The Law of the Republic of Uzbekistan "On Guarantees of Equal Rights and Opportunities for Women and Men" provides for the concept and types of gender equality. In particular, it is given a definition of direct discrimination on the basis of gender, which implies any difference, an exception or limitation that is sent to non-recognized women and men of their rights and freedoms in all spheres of life of society, including discrimination due to marital status, pregnancy, family duties. , as well as sexual harassment, various pay for equal work and qualifications. The law contains the definition and indirect discrimination on the basis of sex as the creation of a situation, the provisions or criteria that are placed by the individuals of the same sex at a less favorable position compared to the persons of the other sex, including the propaganda of gender inequality through the media, education, culture, the establishment of conditions or Requirements that may entail negative consequences for persons of a particular floor [1].

The basic principles of ensuring the guarantees of equal rights and opportunities for women and men in the Republic of Uzbekistan are the legality, democracy, equality of women and men, the inadmissibility of discrimination on the basis of gender, openness and transparency.

The law provides for guarantees to ensure equal rights and opportunities for women and men. The state guarantees women and men equality in the implementation of personal, political, economic, social and cultural rights. The state guarantees women and men equal participation in the management of the affairs of society and the state, the electoral process, ensuring equal rights and opportunities in the field of health, education, science, culture, labor and social protection, as well as in other spheres of state and public life. In order to achieve actual equality between women and men, expanding their participation in all spheres of society, the elimination and prevention of direct and indirect discrimination on the basis of gender by the state are made temporary special measures to ensure the implementation of gender policies.

The law provides for guarantees of equal rights and opportunities for women and men in various spheres of public life, as well as responsibility for violating legislation on the guarantees of equal rights and opportunities for women and men.

The Law of the Republic of Uzbekistan "On the protection of women from oppression and violence" includes provisions that determine the types of oppression and violence in everyday life, at workplaces and educational institutions; the tasks and functions of authorized bodies on countering oppression and violence against women; measures aimed at preventing oppression

and violence, as well as responsibility for the commission of such actions; Procedural guarantees of pre-trial and trials aimed at protecting persons undergoing oppression and violence [18].

In terms of practical actions, in order to prevent gender discrimination, the Commission for the Protection of Gender Equality of Women, with the assistance of the Committee of Women of the Republic of Uzbekistan, whose main tasks are defined:

- Active participation in the implementation of state policies aimed at ensuring gender equality and improving the social conditions of women in the country;
- Consideration of applications of state bodies and other organizations on violations of gender equality of women;
- Development of proposals for implementing generally accepted international norms into national legislation to eradicate all forms of discrimination against women's rights.

V. DISCUSSION AND CONCLUSION

In the modern world, gender issues and the struggle for women's equality, the subject of active discussion is not only scientists, but also in society as a whole. The motor of this attention is the active position of female movements. Obviously, further regulatory work on gender equality should rely on and based on international legal instruments on human rights. First of all, the UN Convention on the Elimination of All Forms of Discrimination against Women (CEDAW), since the Convention contains specific recommendations, which should be done to make states for practical elimination of inequality of men and women at the present stage. Essentially, States are invited to a specific action program in this area.

In the Republic of Uzbekistan, it is advisable for this, firstly, the adoption of measures for the practical implementation of the principle of the equality of men and women. It is possible to do this in the course of planning, developing and implementing special documents, in the development of special provisions - criminal, procedural and executive steps of new editions of codes.

Secondly, to fully take advantage of the possibility of encouraging inclusive work with non-state stakeholders in the field of gender equality.

Thirdly, it is advisable to develop and adopt the concept of family and gender policies in the Republic of Uzbekistan, where it is important to clearly distinguish between the tasks of the family policies and the tasks of gender policies in order to prevent the role of women in the family sphere. To do this, it is necessary to clearly distinguish the goals, objectives and indicators of gender equality policies and family policies. While the family policy can be used as a tool for performing gender equality problems, gender equality policies need to be considered as a comprehensive and multifaceted strategy that goes beyond family issues, and concerning all aspects are relevant both for women and for men, As, for example, family support measures, it is important to ensure that specific objectives relating to the empowerment of women in politics and the economy have been clearly allocated.

Thus, it can be concluded that ensuring consistency of the vision and policy of ensuring gender equality in the Republic of Uzbekistan is associated with the general vision of the country's development, as well as with state policy measures across various sectors and levels of power, in order to develop gender equality in all spheres of life.

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ARTICLE EXPRESSION OF INDEFINITENESS MEANING IN ENGLISH AND UZBEK LANGUAGES

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ABSTRACT

This article is dedicated to the article expression of indefiniteness with lexico-grammatical parts of words in English and Uzbek languages. The expression of indefiniteness of the articles in the system of different languages with lexico-grammatical parts of words have been analyzed and its similarities and differences are determined.

KEYWORDS: *Indefiniteness, Article, Lexico-Grammatical Units, Context, Nouns, Definite, Indefinite, English, Uzbek.*

INTRODUCTION

In modern English, the category of indefiniteness is mainly given by special markers, indefinite articles - a (an).Counting numbers served as the source of the indefinite article, so in these languages, where a system of articles still exists, there is a formal and semantic similarity between the indefinite article and the countable number.The article indicates that the object represented by the name belongs only to this class of objects.

I saw a dog – Men itni ko`rdim, (qanaqadir bir itni) aynan itni, mushukni yoki boshqa biror narsani emas.

In English, an article is the primary means of expressing indefiniteness. Indefiniteness is expressed by the method of opposition: an apple - the apple.In English, the article does not represent other grammatical categories such as rod, consonant, and so on.

2. Main part:

In English, the function of an article is primarily to express the subject, to show that the word used with them is a noun, not a group of words. The article indicates that the noun belongs to the category of accuracy - uncertainty, expressing a number of characteristics that are specific to the noun.According to V.N.Yarseva, "the article is connected with the noun as a group of words, but does not belong to the paradigm of the noun, because it does not participate in the characterization of the meanings that connect the noun with other members of the phrase" .Indefiniteness is represented in every way. It depends on the structure and type of each specific national language.

Depending on whether the abstract level is morphologically developed or not, indefiniteness can be expressed by special prefix morphemes. In addition, the place of the article is determined by the various cases in which the structure of speech is in the general orientation of the constitutions of all its constituents.Thus, the article is represented at the following specific levels of the language hierarchy: morphological, lexical, and syntactic. However, this does not mean that every language has units at all these levels. In some languages, ambiguity is expressed more morphologically, in other languages lexically, and in some languages syntactically. In this regard, the English language is associated with a greater lexical level. However, the other levels were not distinguished in terms of indefiniteness.

In the future, we will be convinced that we have found models with a sense of indefiniteness that act as syntactic constructions.The lexicon of indefiniteness is related to the development of the article.In Old English, the indefinite article did not exist as an independent word group. Later, the English language system itself created such a set of words.So there is a need for an article in the language. If we proceed from the diachronic development of the indefinite article, it has the following dynamics.

In the middle Ages, an indefinite article appears in English. As in other languages, the unstressed variant of that number comes from "one". Then the vowel sound was reduced to the unstressed state and a different unstressed variant was formed.

In Old English, the number "a" took on the form "on" after the long "a" changed to the open "o"; The difference in sounds between the accented and unaccented forms caused the article to be separated from the number.Later, this exchange in the number was abolished, and the form "on" was used in all cases. The exchange of "a" and "an", which are forms of indefinite article, depending on how the next word begins, has survived to the present day.

In English, the number "an" has changed both semantically and phonetically, while the number "bir" in Uzbek has changed semantically, not phonetically. On this basis, "one" remains as a semi-article.A similar historical path has been traversed by the indefiniteness of the Turkish language. This number several linguists consider «one» as an article. It is important to note the difference between the indefinite article in English - a (an) and the number "one" in Uzbek.

He was saving his money to buy a car (BARS).

Ehtimol bir kun borib yarashardik (A.Muxtor, Chinor, 171).

Based on this example, as well as on the basis of materials of other languages, a unique typological conclusion can be drawn: if the language develops an analytical system associated with the complete or partial disappearance of forms of agreement, it accelerates the emergence of articles, or otherwise in other words, this process creates additional conditions for the emergence of articles.It is necessary to point out several assumptions about the development of the article, that is, the emergence of an ambiguous article in English may have been caused by a phono morphological change in the English language.For example, the disappearance of many grammatical prefix morphemes in English has accelerated the development of articles in English. This is emphasized in the comparison of the English language system with the Uzbek language system. At the same time, the developed agreement paradigm, which at the same time has the expression of the contractual relationship, includes the function of nouns used in conjunction with vague and definite articles: *Give me the book. - Menga kitobni bering.Give me a book. - Menga kitob Bering.* In the above examples, the function of the indefinite article is given by omitting the Uzbek suffix.

Indefiniteness in English is mainly expressed by the morphological indicator - the indefinite article - a (an), which is the main indicator of this category and has the highest level of

ambiguity.Other units in the Uzbek language are also considered, as there is no article in this language and the category of indefiniteness is represented by various means.

In the Uzbek language, the function of expressing indefiniteness is performed by several suffixes belonging to different word groups and semantic classes, which mainly represent other categories, but at the same time also serve to express indefiniteness.These include comparisons, diminutives, word-formative forms of modality, and others with their own prefixes - roq, - gina, - kina, and so on.*"Why didn't select a nice subject?" – She was saying. (J.London, "Martin Eden", 118). – Nega chiroyliroq mavzu tanlamadingiz? - dedi qiz. (Jek London, "Martin Iden" 118). I tought you were a crazy girl. (Hemingway, "A Farewell to Arms", 109). Menga sal telbaroq bo`lib ko`ringan edingiz. (E.Heminguey, "Alvido Qurol!", 164). I was a little crazy. (Hemingway E., "A Farewell to Arms!", 109). Ozgina telbaligim ham yo`q emasdi. (E.Heminguey, "Alvido Qurol!", 164). A little , she said. (Hemingway E., "A Farewell to Arms!", 117). Jindakkina, - dedi u. (E.Heminguey, "Alvido Qurol!", 168).*

Indefiniteness - the morphological category of accuracy is not expressed in all languages, where it is expressed in syntactic forms. If this category is expressed in several languages by word forms, in other languages it is expressed by auxiliary words. Even if the article is expressed by auxiliary words, it belongs to the morphological category. Like other morphological categories, the article covers nouns entirely and can be studied as one of the indicators of this word group.

In a number of languages, it performs the formal function of expressing the syntactic connection of a noun with a noun. This process occurs either in the adaptation of the article, or under the influence of the word system. The morphological nature of the article thus does not cause any hesitation.The physical existence of articles is not universal. For example, there is no article in Russian. "In another case, through the use of an article, the listener is warned that the cognate noun distinguishes one or more of the many abstract nouns, and that it is not the general concept of the subject but the actual subject that is singled out. This task, which can be called a highlighting task, is performed using an indefinite article" (68, 220).

In languages where the article does not exist, the task of highlighting the subject is performed by various means.Thus, the purpose of the situational actualization of the concept of subject in the Uzbek language is, first of all, "one, somehow, somehow" (of which "somehow, somehow" means to show that the subject is not well known to the speaker) They do it themselves.Thus, an article is a morphological category, regardless of whether it is expressed by a prefix or an auxiliary word.

In English, the category of precision and ambiguity has a grammatical character. This is the definite article - the and the indefinite article - a (an).The semantic structure of an indefinite article includes:1) the specific meaning of the classification related to the subject to which it belongs belongs to the class of this or that subject:*a dog - it (har qanday bir it)* 2) nouns with the meaning of uniqueness, indefinite article "a (an)" are always used in the singular:*a book (any single book), an apple*3) the meaning of indefinitenessClassification"A (an)" is unique

Indefiniteness

In contrast to English, the category of definiteness and indefiniteness in Uzbek has morphological and lexical meanings. "Somehow, somehow, something" corresponds to the indefinite article on all functions performed by the pronouns and the number "one".Based on this, we can say that the article is an indicator and a marker of accuracy and uncertainty. In this case, the articles with the above meanings remain the central unit. However, it should be noted that there are other decentralized units that represent the same function. Many languages have them all, while others have some of them.

CONCLUSION

1.Indefiniteness is a category of different types, that is, typological means belong to different word groups: articles, nouns, numbers, rhymes, forms, connectives, modal words, and so on. Each category has its own characteristics, that is, some express the indefiniteness in the implicit way, while others express it in the explicit way. This proves that indefiniteness is common to all word groups. In English the main marker of indefiniteness is the article, and in Turkish such a function is represented by the number "one". These ideas prove that the process of converting a number into an article in English has been completed, and in Uzbek this process is still going on. In both languages being compared articles and other word groups constitute the main group of means representing the category of indefiniteness. Repetitive words in the languages being compared play an important role in the expression of the selected category.

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CRITICAL REVIEW OF WEB MINING FOR LEARNING ONTOLOGIES

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ABSTRACT

The purpose of this paper is to study and discuss the topic of creating ontologies using Semantic Web Mining, which is described as a mix of the two rapidly expanding research fields of Semantic Web and Web Mining. The Semantic Web is the second-generation WWW, supplemented by machine-processable information that assists the user in his duties. Web mining is the application of data mining techniques to the content, structure, and usage of Web resources.This can aid in the discovery of global and local structural "models" or "patterns" within and across Web pages, as well as the extraction of ontologies. The automatic or semi-automated development of ontologies, which includes extracting the related domain's words and connections between such concepts, and encoding them using an ontology language for simple retrieval. Because manually creating ontologies is very time-consuming and labor-intensive, there is a strong need to automate the process. This paper provides an outline of where the two fields now intersect, as well as suggestions for how a tighter integration may be beneficial.

KEYWORDS: *Knowledge Discovery, Ontology, Ontology Learning, Semantic Web, Web Mining.*

14. INTRODUCTION

Because it is one of the newest and most forward-looking media, and undoubtedly the medium of the future, the Internet is becoming increasingly essential for virtually everyone.Because of unstructured online contents and a lack of standards, the extraction of valuable knowledge from the Web is becoming increasingly challenging. This complexity in the treatment and extraction of data is developing. Large-scale data knowledge Web pages make information difficult to utilize. In the recent decade, a slew of ways have been developed that integrate data mining and knowledge discovery methods with Semantic Web data. The objective of these techniques is to

aid various data mining activities or to improve the Semantic Web as a whole. All of these techniques fall into one of three major categories:

- Supporting knowledge discovery with Semantic Web-based methods, Semantic Web Technologies, and Linked Open Data.
- Mining the Semantic Web with data mining techniques, also known as Semantic Web Mining.
- Creating and improving Semantic Web data using machine learning approaches.

Tim Berners-newest Lee's effort, the Semantic Web, is an expansion of the present Web that makes it simpler to locate, exchange, reuse, and combine information[1]. It is built on machine-readable data and draws on the capabilities of XML technology to establish unique tagging schemes as well as RDF's (Resource Description Framework) flexible approach to data representation. The Semantic Web establishes standard data transfer formats. It also provides a common language for recording how data relates to real-world objects, allowing a person or machine to start with one database and then move through an infinite number of knowledge databases to find various concepts and words to build ontologies and representations in a way that all users can understand and consume.

In order to extract relevant and shared knowledge, this study will outline the similarities of the two fields.

14.1. Basic Definitions:

14.1.1. Ontology:

Ontology explicitly defines the words used to describe and represent a body of knowledge. People, databases, and applications that need to exchange domain information utilize ontologies. Ontologies are computer-readable descriptions of the domain's core ideas and their relationships. They may store both domain-specific and cross-domain information[2].

An ontology, in more technical terms, is made up of classes, connections, and characteristics. An ontology's classes are generic entities that exist in a variety of fields of interest. The names of classes are usually nouns. The relationships exist between the items; in this study, we utilize two relationships: ‘part-of' and ‘is-a.' The properties or attributes are the qualities or characteristics that objects can have.

Let's start with an example of an ontology and its representation, as shown in Fig. 1.

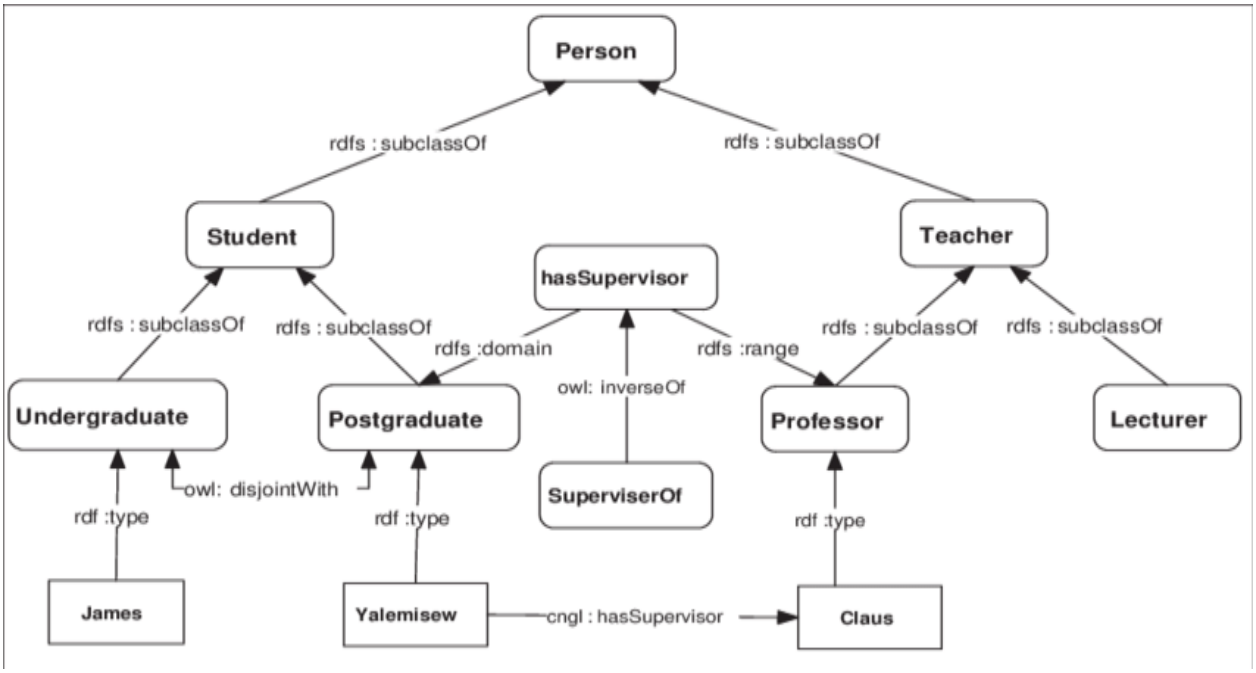

Fig. 1: Example of an ontology- The University Structure[3]

14.1.2. Semantic Web Mining:

On the one hand, human ability to comprehend information is limited, but the amount of available information on the Web grows rapidly, resulting in rising information saturation. In this environment, detecting valuable trends in the Web and using it as a rich source for data mining becomes increasingly crucial.

The Semantic Web Mining study area aims to combine two rapidly expanding disciplines of research: the Semantic Web and Web Mining[4]. The goal is to enhance Web Mining results by utilizing new semantic structures in the Web on the one hand, and to use Web Mining to build up the Semantic Web on the other side. These two categories address one of the World Wide Web's (WWW) current challenges: utilizing Semantic Web technologies to convert unstructured data into machine-understandable data.

Because the Semantic Web adds formal semantics to the first generation of the WWW, it provides a solid foundation for Web mining: The sorts of links or hyperlinks are now fully specified, allowing the knowledge engineer to get deeper insights into Web structure mining; and the contents of the pages are now accompanied by a formal semantics, allowing mining techniques that need more structured input to be used.

14.1.3. Semantic Web Content and Structure Mining:

Content and structure are inextricably linked on the Semantic Web. As a result, there is no longer a distinction between content and structure mining. The distribution of semantic annotations, on the other hand, may give extra implicit knowledge. The methodologies presented as Relational Data Mining, originally known as Inductive Logic Programming(ILP), are an important collection of techniques that may easily be applied to semantic web content or structure mining[5]. In a relational database, relational data mining looks for patterns involving many relations. It includes Semantic Web Mining methods such as classification, regression, clustering, and association analysis. It is quite simple to adapt the algorithms so that they can cope with data defined in RDF or via ontologies.

This endeavor faces two major scientific obstacles. The first is the amount of data to be processed, i.e. the algorithms' scalability, and the second is that the data is dispersed over the

Semantic Web because there is no central database server. For ILP algorithms, scalability has always been a key problem. With the Semantic Web's projected expansion, this problem will only get worse. As a result, the mining algorithms' performance must be enhanced, for example, by sampling.

14.1.4. Semantic Web Usage Mining:

Usage mining can be improved much more if the semantics are included clearly in the pages by referencing to ontology topics. For example, semantic web use mining may be done on log files that record user activity in terms of an ontology. The AIFB has created a mechanism for generating such semantic log files from a knowledge portal. These log data may then be mined to give customized perspectives of the ontology, such as clustering people with similar interests.

15. DISCUSSION

15.1. The Knowledge Discovery Process:

The five phases in the process model for knowledge discovery lead from raw data to actionable information and insights that are of immediate use to the user. Fig. 2 depicts the entire procedure. There are five steps to it:

i. Selection:

The first stage is to gain a thorough understanding of the application domain, capture important prior information, and determine the data mining aim from the perspective of the end user. The target data utilized in the knowledge discovery process may be chosen based on that understanding, which includes picking appropriate data samples and a relevant subset of variables.

ii. Preprocessing:

In this phase, the selected data is processed in such a way that it may be analyzed later. The management of missing values, the detection and possible repair of noise and mistakes in the data, the elimination of duplicates, and the matching, fusion, and conflict resolution for data from many sources are all common activities done in this stage.

iii. Transformation:

The third stage transforms the data into a format that data mining algorithms can understand in most situations; this involves converting the data into a propositional format, with each instance represented by a feature vector. Dimensionality reduction techniques can be used in this phase to minimize the effective number of variables under consideration, which will increase the performance of following data mining algorithms.

iv. Data Mining:

Once the data is in a usable format, the process's original aim is assigned to a specific method, such as classification, regression, or clustering. This step entails determining which models and attributes are appropriate (models for categorical data differ from models for numerical data, for example), as well as matching a specific data mining method to the KDD process's overall criteria (for instance, the end user may prefer an interpretable but less accurate model versus a highly accurate but difficult to interpret model). Following the selection of the data mining technique and algorithm, the data mining process begins: looking for patterns of interest in a specific representational form or set of depictions, such as rule sets or trees.

v. Evaluation and Interpretation:

The validity of the patterns and models produced by the data mining algorithms is checked in the last phase. In addition, the user evaluates the usefulness of the discovered knowledge in the

context of the program. This stage can also include visualizing the extracted patterns and models, as well as visualizing the data using the models.

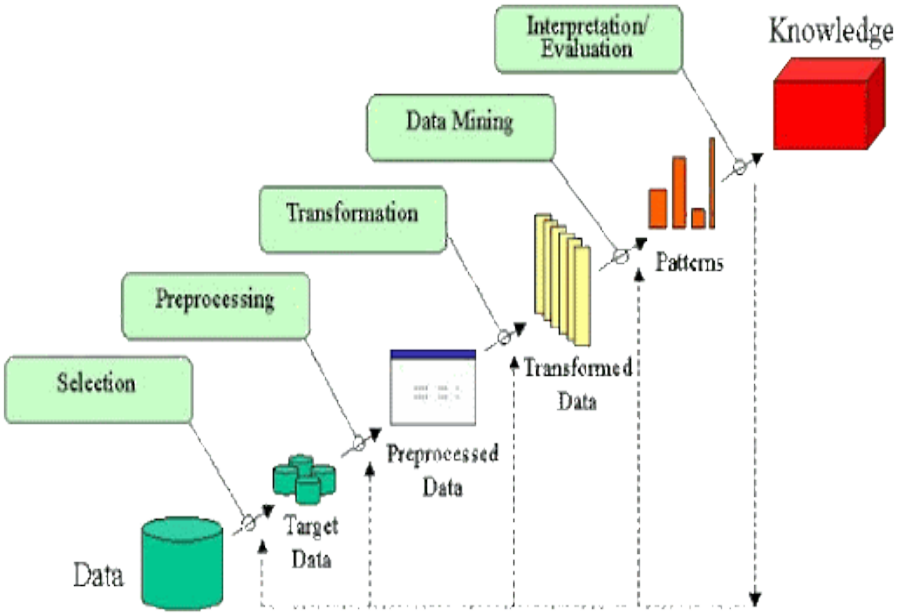

Fig. 2: Process of knowledge discovery [6]**.**

15.2. Ontology Learning Process:

Ontology learning is a technique for extracting entire ontologies from natural language text or Web pages automatically or semi-automatically. The method is generally broken down into the eight steps below, but not all of them are required in every ontology learning system.

i. Domain Terminology Extraction:

Domain specific words are retrieved during the domain terminology extraction stage, which are then utilized to derive concepts in the next step. Relevant words can be found, for example, by calculating TF/IDF values or using the C-value / NC-value technique. A domain expert must next filter the resultant list of keywords. The OL system then identifies synonyms, similar to how the IE system decides co-reference resolution, since they have the same meaning and so relate to the same idea. Clustering and the use of statistical similarity metrics are the most frequent approaches.

ii. Concept Discovery:

Terms are organized into meaning carrying units that correspond to a simplification of the world and thus to concepts, in the concept discovery stage. These domain-specific words and their synonyms were found in the domain vocabulary extraction stage and are grouped together.

iii. Concept Hierarchy Derivation:

The OL system attempts to organize the retrieved ideas in a taxonomic framework during the concept hierarchy generation stage. Unsupervised hierarchical clustering techniques are commonly used to achieve this. Because the output of such approaches is frequently noisy, a level of oversight, such as user assessment, is incorporated. Another technique for constructing a concept hierarchy is to employ a number of patterns that should suggest a subsumption or supersumption connection. X is a subclass of Y, as shown by patterns like "X, that is a Y" or "X is a Y." Such patterns can be effectively examined, but they are far too rare to extract sufficient sub- or supersumption connections. Instead, bootstrapping approaches are being developed, which automatically learn these patterns and therefore assure a better level of coverage.

iv. Learning Of Non-Taxonomic Relations:

Relationships that do not express any sub- or supersumption are retrieved during the learning of non-taxonomic relations phase. Works-for and located-in are two examples of such connections. There are two typical methods for completing this subtask. The first is based on the extraction of anonymous relationships, which are then given suitable names in a subsequent phase. The second method removes verbs that show a connection between the items represented by the surrounding nouns. However, an ontologist must assess the outcome of these techniques.

v. Rule Discovery:

Axioms or formal descriptions of ideas are created for the retrieved concepts during rule discovery. This can be accomplished, for example, by evaluating the syntactic structure of a natural language specification and applying transformation rules to the dependency tree that results. This procedure produces a list of axioms, which is then translated into a concept description. An ontologist will have to assess this one.

vi. Ontology Population:

The ontology is supplemented with examples of concepts and attributes during the ontology population stage. Methods based on the matching of lexico-syntactic patterns are utilized for the augmentation of ideas with examples. Application of bootstrapping techniques, which gather relation tuples, adds instances of properties.

vii. Concept Hierarchy Extension:

The OL system aims to expand the taxonomic structure of an existing ontology with new concepts in the concept hierarchy extension stage. This may be done either supervised with the use of a trained classifier or unsupervised with the use of similarity measurements and shown in Fig.3.

viii. Tools:

DOG4DAG is a plug-in for Protégé 4.1 and OBO-Edit 2.1 that allows you to create ontologies[7]. It has the ability to generate terms, siblings, definitions, and relationships. DOG4DAG is an ontology extension tool that is built into Protégé 4.1 and OBO-Edit 2.1. It supports all popular ontology formats, including OWL and OBO[8], [9]. The lookup service additions are mostly limited to EBI and Bio Portal. Users may express clear, formal domain models using OWL ontology languages. They meet all of the fundamental criteria for ontology languages, including:

- Convenience of expression
- Efficient reasoning support
- Formal semantics
- Well-defined syntax

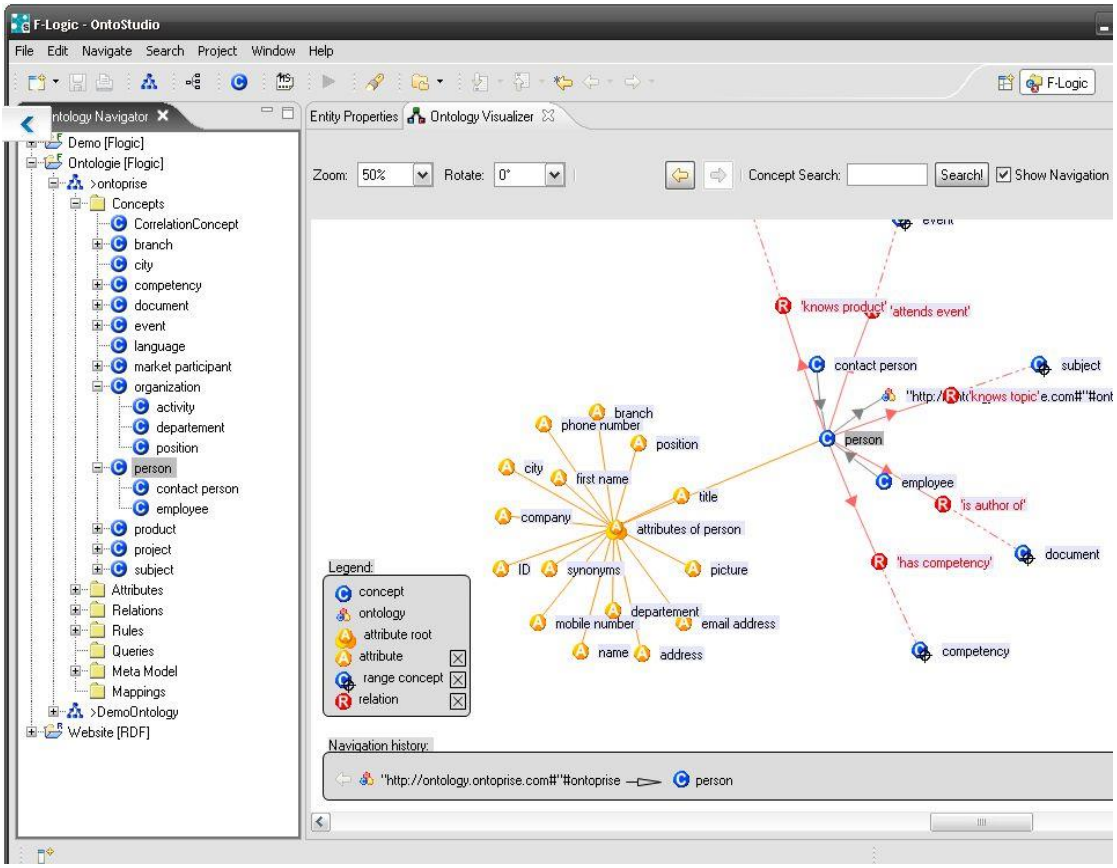

Fig. 3: Illustrates building ontolgy example with ontoStudio[10]**.**

The OWL and RDF subclass relationship attribute OWL is based on RDF and RDF schema, and it utilizes the XML-based syntax of RDF. OWL may be defined using XML-based syntax, Abstract RDF-based syntax, or Graphical Syntax. The proposed architecture was used to create an ontology based on a web log that was defined using the web ontology language (OWL). This program will assist web writers by evaluating user browser history of web sites that are often frequented by people and the products that are popular in the market. Web structure mining has been used to assist with the development of ontologies and the retrieval process.

16. CONCLUSION

The usage of ontology in Web mining is summarized in this article. We pay special attention to how ontology has been integrated into Web mining. We spoke about how Semantic Web Mining can enhance Web Mining results by using new semantic structures in the Web, as well as how Web Mining methods may be used to build the Semantic Web.To comprehend and change the Web, we anticipate Web Mining techniques to progressively handle content, structure, and use in an integrated manner in iterated cycles of extracting and using semantics. We anticipate to see a fruitful complementarily between those depending on semantics in the sense of the Semantic Web and others relying on a broader definition of semantics among those iterated cycles.

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THE IMPACT ON ENVIRONMENT DUE TO TECHNOLOGICAL ADVANCEMENT IN AGRICULTURE

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ABSTRACT

Agriculture is one of India's most vital sectors, and it is critical for the country's economic survival and development. Agriculture is the source of livelihood for about 70% of households and 10% of the urban population. Today, India is the world's biggest exporter of agricultural goods such as coffee, tea, rice, oil meals, spices, meat, fresh fruits and vegetables, as well as their preparation and marine products. The Indian Agriculture Research System is the pinnacle of a process that began in the nineteenth century and culminated in the creation of the ICAR (Indian Council of Agricultural Research) in 1929, after the recommendation of a Royal Commission on Agriculture. In the present research system, the Indian-Council-of-Agriculture-Research (ICAR) primarily assists, promotes, and collaborates on research and education in India at the national level. Because farmers strive to feed the globe with limited natural resources, technological advancements are critical to the future of farming. The agri-tech solution contributes to the overall expansion of sustainable agriculture and food production. Agri-tech startups and disruptive market newcomers are the focus of the funding. Agriculture output increases as a result of new technology, resource input, and economic incentives. Future food-production and handling technological development should be non-polluting, minimize environmental and health risks, and not inspire additional governmental restrictions.

KEYWORDS:*Agriculture, Economic, Environment, Innovation, Sustainable.*

1. INTRODUCTION

Agriculture is the most common land use on the planet. Approximately 1.2 billion–1.5 billion hectares are now under cultivation, with 3.5 billion hectares grazed. Agriculture is India's economic powerhouse, and it plays a critical part in the country's social and economic domains. Productivity, economic viability, environmental effect, and social well-being are the four major sustainability indicators for agricultural production. The biggest problem in today's situation is to provide an adequate food supply for the world's population. The environmental impact of agriculture (Figure 1) on ecosystems in different agricultural practices and how that influence may be linked back to the agriculture practice. Agriculturing's environmental effect varies widely depending on the farmer's methods and the size of such operations. Sustainable-Agriculture techniques are agri-practices that try to reduce environmental effect by changing the practice [1], [2].

Natural resource scarcity, climate change, and food waste are the major factors putting strain on the agricultural model's ability to meet future requirements. All of these factors are exacerbating the issue of hunger and food shortage. Experts employ two kinds of indicators when evaluating the environmental impact: mean-based, which is reliant on the grower's production technique, and effects-based, which is the influence of farming methods on the agricultural system. The superiority of groundwater that is influenced by the amount of nitrogen in soil is an example of a mean-based approach. The indicators used to identify Nitrate damage to groundwater are "effects-based." The farmer's agriculturing practice is examined in a means-based evaluation, whereas the actual impact of agricultural practice is examined in an effects-based assessment. Farmers employ a “mean-based” pesticide and fertilizer analysis technique, while an “effect-based” evaluation analyzes how much carbon dioxide is released and how much nitrogen is present in the soil [3], [4].

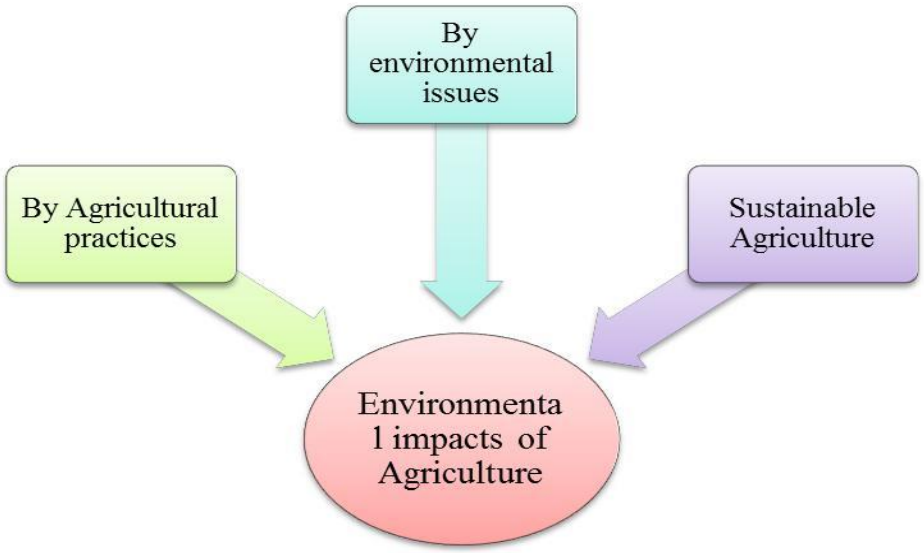

Figure 1: Illustrates the environmental impacts of agriculture in different Agriculture Practices.

Agriculture's environmental effect includes a range of factors such as soil, air, water, animal & soil-variety, plants, humans, and the food itself. Agriculturists contribute to a slew of environmental issues, including climate change, irrigation, genetic engineering, soil pollution, and waste. Sustainable agriculture is the concept that agriculture should be conducted in such a manner that we can continue to produce what is necessary without jeopardizing future generations' capacity to do so. In recent decades, rapid population growth has boosted agricultural land conversions to meet food demands, which has had a negative impact on the

environment. Agriculture has the potential to have a detrimental effect on biodiversity. Organic farming is a multi-faceted, long-term agricultural technique that has the least environmental effect on a small scale. In terms of production/unit/area, organic farming produces less. To achieve the same level of production, organic farming requires more land to be cleared and water resources to be removed. Governments, investors, and new agricultural technology will need to work together to address all of the problems [5]–[7].

Technological applications to agricultural production are seen to be the answer to meeting the growing population's food needs. To meet the need of a fast growing population, agricultural output requires a 70% increase in production, as well as successful expansion in harvesting, distribution, and resource intake. There are many innovations in the field of information and communication technology that may be used to the agriculture sector in areas such as precision agriculture, farm management software, agricultural equipment, and wireless sensors. Precision agriculture techniques rely heavily on remote-sensor technology. The study uses an aerial-vehicle to capture pictures, process them, and analyze them, highlighting technological advancements in agriculture. For our country's economy to grow from agriculture to emerging states, agricultural development is insufficient. Agriculture development and non-farm sector development are inextricably linked. For example, farming provides food, its processed materials, and labor, whereas the non-farm sector provides products and services in rural areas.

Agriculture and farm operations will have to be managed in a completely different way as technology advances, such as gadgets, sensors, machinery, and information technology. Temperature and moisture sensors, robotics, ariel pictures, and GPS technologies will all be used in future agriculture.

The sophisticated gadget and robotic-system will enable the farm to be more environmentally friendly, productive, and safe. New technology innovation is a key driver of socioeconomic growth, particularly ecofriendly breakthroughs that boost output while simultaneously maximizing the efficient use of natural resources. Through diverse processes, the employment of various technologies in agriculture increases growth and development with effective production. Rural-development has been able to reduce poverty as a result of the following effects of technology usage and innovation. The primary objectives of the agricultural sector are to increase production and increase farmer income.

2. IMPACT OF TECHNOLOGY ADVANCEMENT

The use of innovative technologies in the global economy is a defining element in the race and has a significant effect on agriculture. Innovation is a key driver of social and economic development, especially environmentally friendly innovation that boosts output and promotes efficient natural resource management. The concepts and notion of agricultural sustainability, with a focus on genetic improvement through contemporary ecological methods and better understandings as a result of ecological and scientific-agricultural organization, redesign, and modification. The explanation for the rise in interest in agriculture's long-term viability. People interested in ecologically friendly and healthy farming, as well as those concerned about their economic and social dimensions, use the phrase "sustainable agriculture." The concept of sustainable agriculture refers to agriculture's final goal, which may allow it to fulfill requirements on both sides of the spectrum. According to reports, the agriculture sector must re-establish itself based on the principle of sustainable agriculture, which increases agricultural effectiveness. The re-established use of the sustainable-agriculturing principle and proper respect for the region's social, economic, and environmental characteristics are required. The connection between organic farming and other alternative agricultural methods. To those who do not believe that sustainable agriculture is necessary to signal the end of large-scale farming, and who value

the sector's ability to continue to provide food for a city-population that has little or no contact with agriculture producers, stricter regulations and standard protection are critical [8], [9].

Agricultural sustainability has been limited completely to the quest for potentially more sustainable agriculture methods in the future. These methods have also focused on the present crop and animals in each producing region. All sustainability criteria, such as resource conservation, environmental preservation, and farming in harmony with nature, will increase rather than decrease world food supply. There are about 570 million farms in the globe, while financing cycles in technology-innovation in agriculture have grown by almost $570 million in 2014. While most of the investment is going into agri-tech startups and disrupting the market for newcomers, the need for innovation in resource usage, particularly in terms of land, water, and energy, is still very much there for increasing competence and profitability.

Agricultural's scope has been broadened by the expansion of the agriculture food sector and its integrated supply chain, as well as globalisation, high-tech and economic advancements, and environmental impacts. In addition, previous global economic crises have shown a lack of applicability and durability of the current-growth model and agricultural strategy. New-structural solution is thus needed. Apart from all other considerations, the modern-growth-theory views technological advancements as tools for economic development. This technological application will significantly contribute to the expansion of the countryside and the reduction of poverty. Science, engineering, and technology advancements are key tools that assist to achieve the above-mentioned objectives and bring about the improvements.

Innovation is a fantastic concept that encompasses more than just technology. Innovation is a process in which a person or organization introduces new/existing goods, processes, or organizational methods for the first time. Agriculture encompasses the whole value chain, from agricultural, fisheries, forestry, and livestock production to input and resource management, as well as market access. Innovator was founded by the American Seed Trade Association (ASTA) and the Biotechnology Innovation Organization (BIO). This unique forum will elicit a serious and thoughtful debate about food and agricultural innovation, as well as the actual benefits it brings to our world, health, and food. Farmers may use scientific data and technology to improve crop yields and stay current with cutting-edge agricultural methods.

The use of ag-tech to agricultural output is critical to meeting the growing population's food need. To meet the requirements of a rapidly expanding population, agricultural productivity must increase by 70% in manufacturing and improve proficiently in harvesting, consuming, and resource distribution. Inventions in information and communication technology that may benefit the agricultural sector in many areas of sustainable agriculture, such as the use of farm-management software, agriculture equipment, and wireless-sensors. In order to farm sustainably, remote-detection technology is critical. Agriculture output will increase as a consequence of new technology, increased source effort, and lucrative inducements. Food processing and other high-tech advances should be non-polluting, reduce environmental risks, and not rely on new regulatory forms.

3. ADVANCEMENT IN TECHNOLOGY

Advancement in technologies are the future of agriculturing because farmer make every effort to feed all over the world with inadequate natural resources.

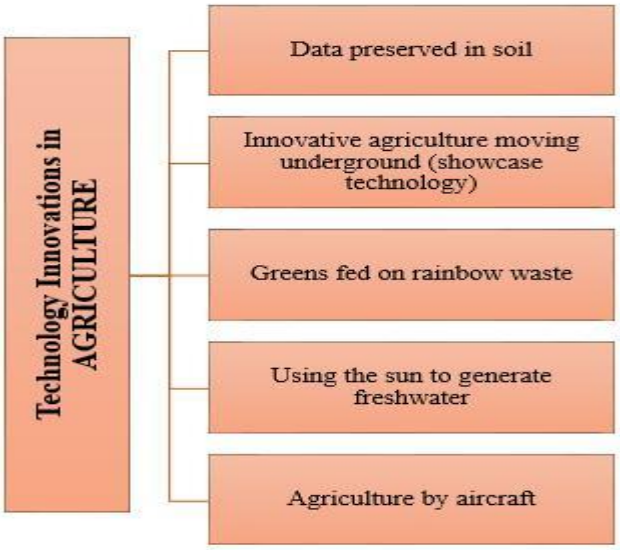

Figure 2: Illustrating the Advancement in Technological Innovation in Agriculture

Agriculture productivity will rise as a consequence of new technology, resource input, and economic incentives. Future technology advancements in food processing and other activities must be nonpolluting, minimize environmental risks, and not inspire additional regulatory controls. The study's main focus is on resource innovation in terms of land, water, and energy, with the goal of increasing effectiveness and yield [10]. Figure 2 depicts five ag-tech startup technologies that may help the world's growth of sustainable agriculture and food handling:

3.1. Data that has been preserved in the soil:

The main need of traditional agricultural models is the availability and suitability of land. By combining new analyses, field experiments, statistics, and crowd-sourcing, the African-Soil-Information-Services (AFSIS) is developing soil-maps. The key to planning sustainable agricultural growth and natural resource management is innovative farming ideas like digital soil mapping. All of these maps are freely available to be examined on Google Earth.

3.2. Innovative underground agriculture:

Compared to conventional agriculture, subterranean agriculture offers a lot of benefits. By being inside a big metropolis, farmers can provide fresh food to a huge metropolitan market. They don't have any pests, so they don't have to use pesticides, and the weather is never an issue. The use of technology in agriculture promotes development and expansion via active manufacturing processes. Hydroponics-based cultivation progresses at double the rate of traditional cultivation. A special LED lighting gadget is utilized in this procedure to speed up the photosynthesis process.

3.3. Green waste rainbow fed:

Embracing a moral circle of exchange is a common agricultural idea. Hydroponics is a technique of growing plants that utilizes mineral-enriched water. In an aquaponics recirculating system, fish farming and plant growing are combined. Fish provides nearly all of the plant's nutrition in the form of aquaculture sewage, which is separated from fish waste metabolites by direct absorption and nitrification by plants in properly maintained water, and then returned to the fish. When compared to conventional horticulture agriculturing, this revolutionary farming concept uses less water. At Bioaqua Farming (Blackford) in Somerset, one of Europe's largest combined aquaponics farms, vegetables are produced and Rainbow Trout are reared in an organic

association without the use of chemicals or pesticides, instead relying on the assistance of bees and worms.

3.4. Solar-energy generation of fresh water:

The primary trend in agriculture is to improve water efficiency in farming and food production. The argument is that despite the fact that water covers 71% of our globe, there is still a shortage of water. Sundrop Farms is one of the agricultural inventions that makes use of a rare renewable resource that is abundant in comparison to seawater: sunshine. Sundrop Farm collects solar energy to provide energy for purifying and hydroponics greenhouse supplies. When compared to traditional greenhouse production, sundrop farms minimize reliance on limited natural resources.

3.5. Airborne agriculture:

The agricultural sector is increasingly reliant on aircraft. Crop dusting, fertilizer spraying, pesticide distribution, topdressing, and hydro-seeding are all common uses for agricultural aircraft. In the agricultural industry, crop dusting is also known as aerial application, and it is one of the keys to contemporary efficiency in agriculture. Such aircrafts must improve their efficiency, cost-effectiveness, environmental compatibility, and safety. Traditional fuels and tube wing designs are the only options for aircraft design.

4. DISCUSSION

Innovation is a key driver of social and economic development, especially environmentally responsible innovation that boosts output and makes better use of natural resources. As the world's political, economic, and environmental conditions change, innovation is currently supporting higher values in organic raw materials in a series-processing, packing, storage, transportation, and distribution of food after production and food safety. As a result, the use of equipment in farming accelerates growth and development by allowing for effective production via a defined procedure. Over time, the application of technology and creativity may have resulted in a reduction in poverty in rural areas. A conceptual framework for modernization, primarily for the utilization of machinery, must be developed. In terms of R&D and scope, the farmer must clearly understand how the development and implementation of inventions will allow for potential agricultural impacts. The aim of R&D should not be restricted to a certain proportion of budget allocation. It should be recognized that science's contribution to society is one of the most important foundations for sustaining agricultural output.

Increasing agricultural production, increasing farmer income, reducing poverty, and expanding rural areas are not insurmountable objectives. Growth in income among small farmers and corporate businesses, as well as in the agricultural sector and food chain, would result in a substantial increase in social benefit in the nation. To improve efficiency and reduce poverty in rural regions, comprehensive and inclusive research and strategies are needed. Taking action has become authoritative in light of the well-organized utilization of natural resources, food security, and the effects of climate change. Various technical advances, including as sensors, machines, gadgets, and information technology, will need farm houses and agricultural operations to be managed in a completely different manner. Moisture, robotics, Ariel pictures, temperature sensors, and GPS technology will all be used in future farming. These gadgets and robotic structures will make farming more environmentally friendly, cost-effective, efficient, and secure.

High-tech agricultural output is a way to meet the growing population's food needs. To meet all of the needs of a rapidly increasing population, agricultural productivity must increase by 70% in making levels and improve proficiently in harvesting, marketing, and resource intake. Various innovations in the field of information and communication technology that may benefit the agricultural sector in the fields of precision agriculture, farm management software, wireless sensor technologies, and agriculturing equipment technology. Precision agriculture makes

extensive use of remote detection equipment. The article examines how precision agriculture is influencing agricultural practices via the use of aerial vehicles for imaging, handling, and inspection. Because farmers are attempting to feed the whole globe with limited natural resources, technological innovation is critical to the future of agriculture.

Agriculture output will increase as a consequence of new technology, source effort, and economic inducements. Future high-tech advances in food processing and other activities should be non-polluting, reduce environmental risks, and not be accompanied by additional regulatory forms. The significance of this research is the invention of new land, energy, and water sources that increase efficiency and productivity. There are five high-tech solutions that are helping to support the global expansion of sustainable farming and food manufacturing: preserved data in the soil in the form of maps, underground agriculture innovation using hydroponics with LED lighting for photosynthesis, greens fed on rainbow waste without chemicals or pesticides, use of the sun to generate freshwater via Sundrop farms, and a new crop of greens fed on rainbow waste without chemicals or pesticides. Agricultural development has been influenced substantially by technological advancements throughout time. Humans have discovered a new method to make agriculture more effective and produce more food by developing a tool to Global-Positioning-System (GPS) centered on precision-farming gear. A technological revolt in farming is being steered by advances in robotics and detection technologies, which seem to be on the verge of disrupting current methods. Automation and robotics, vertical indoor farming, livestock technology, precision agriculture, up-to-date greenhouse practice, artificial intelligence, and block-chain technology are all examples of major space technology advancement.

5. CONCLUSION

In current agricultural techniques, innovations are more important than ever. The agricultural sector is facing significant difficulties, including workforce scarcity, increasing supply prices, and shifting customer preferences for transparency and sustainability. Cultivation businesses are increasingly aware that a solution is required to address these issues. The advantages of indoor-vertical-farming are numerous, ranging from sustainable urban-growth to capitalizing on agricultural production with low employment expenses. Vertical farming can control factors like humidity, light, and water to precisely measure year-round, resulting in constant food production. Farm robotics, often known as "smart farming," is a kind of technology that allows farmers to automate the crop/livestock production cycle. Drones, self-driving tractors, automated watering, robotic harvesters, and seeding robots are all being developed by a growing number of businesses. Industry is now experiencing unprecedented growth, thanks in large part to amazing recent technological advancements. Today's greenhouses are large-scale, capital-infused, and urban-focused. The objective is for the farmer to use artificial intelligence to accomplish his or her aims of a higher crop by making better field decisions.

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DEEP LEARNING FOR RENEWABLE ENERGY FORECASTING: A REVIEW

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ABSTRACT

Improving the accuracy of renewable energy forecasting is important to power system planning, management, and operations as renewable energy becomes more prevalent in the worldwide electric energy grid. Due of the sporadic and unpredictable nature of renewable energy data, this is a difficult job. To date, a variety of approaches have been developed to enhance the forecasting accuracy of renewable energy, including physical models, statistical methods, artificial intelligence techniques, and their hybrids. Deep learning has been widely described in the literature as a potential form of machine learning capable of finding intrinsic nonlinear characteristics and high-level invariant structures in data. This article offers a thorough and in-depth examination of deep learning-based renewable energy forecasting techniques in order to assess their efficacy, efficiency, and application potential. Deep belief network, stack auto-encoder, deep recurrent neural network, and others are the four categories of extant deterministic and probabilistic forecasting techniques based on deep learning. To enhance forecasting accuracy, we also analyze viable data pre-processing approaches and error post-correction procedures. Various deep learning-based forecasting techniques are thoroughly examined and discussed. Finally, we look at present research efforts, problems, and future research goals in this area.

KEYWORDS:*Deep Learning, Deterministic Forecasting, Machine Learning, Probabilistic Forecasting, Renewable Energy.*

INTRODUCTION

Fossil fuels are still the world's most significant source of energy today. Hydrocarbons or its derivatives, such as coal, oil, and natural gas, are examples of fossil fuels. Fossil fuels take millions of years to produce, and existing stocks are destroyed far quicker than new fossil fuels are created. Simultaneously, fossil fuels produce greenhouse gases, which exacerbate climate

change such as global warming, putting people's livelihoods in jeopardy. As a result, renewable energy has received a lot of attention in recent years all around the globe [1]. Solar energy, wind power, tidal energy, and geothermal energy are examples of renewable energy that can be recycled in nature. Renewable energy offers at least two benefits over fossil fuels. To begin with, renewable energy resources are plentiful and renewable across the globe, and they are unrenewable. Second, renewable energy is clean, green, and low-carbon, making it good for environmental protection [2].

In particular, renewable energy can efficiently decrease sulfide (SO_2), carbide (CO), and dust emissions, lowering the danger of air pollution and the greenhouse impact. Furthermore, the usage of renewable energy may help to decrease the use of natural fossil fuels while also achieving the goal of environmental protection. Furthermore, renewable energy may help to decrease solid waste discharge and therefore soil contamination. Renewable energy may help decrease waste gas and waste liquid emissions during usage, thus meeting the goal of water resource protection. As a result, renewable energy has exploded in popularity in recent years. Renewable energy accounted for 19.3 percent of worldwide energy consumption and 24.5 percent of power production in 2016, according to REN21's 2017 report. Many nations, including the United States and China, have created regulatory measures, incentives, and subsidies to promote the use of renewable energy. Although renewable energy is seen as the most promising alternative to fossil fuels because it is clean, green, and naturally replenished over a large geographic area, it also introduces uncontrollable uncertainty, which jeopardizes energy system reliability and stability, particularly with large-scale renewable energy integration [3].

On the one hand, renewable energy is characterized by high volatility, intermittent nature, and unpredictability, all of which will certainly raise the reserve capacity of electric energy systems, raising the cost of power production. The utilization of renewable energy, on the other hand, necessitates a high number of power electronics, which lowers the power system's rotational inertia and therefore diminishes the system's stability margin. As a result, renewable energy forecasting as an effective tool for reducing associated risks is critical for electrical power and energy system planning, management, and operation [4]. Due to the intermittent, chaotic, and unpredictable character of renewable energy data, reliable renewable energy forecasting remains a difficult job. Various methods for providing accurate renewable energy forecasts for the next few minutes to the next few days have been described in the literature. Physical approaches, statistical models, artificial intelligence techniques, and their hybrid methods are generally classified into four groups. Numerical weather prediction (NWP) models, which simulate atmospheric dynamics based on physical principles and boundary conditions, are used in physical techniques [5]. Limited area models, such as the fifth-generation mesoscale model and high resolution fast refresh, are included in NWP models, as are global models, such as the global forecast system and integrated forecast model.

Temperature, pressure, jaggedness, and orography are only a few of the climatic and geographical variables that go into NWP. Physical techniques are effective in predicting atmospheric dynamics, but they need a lot of computing resources since they require a lot of data to calibrate [6]. This becomes much more problematic when physical techniques make unanticipated mistakes during prediction. As a result, physical techniques are ineffective for predicting with short time horizons. Statistical models are used to discover the mathematical connection between online renewable energy time series data. In the literature, the auto regressive moving average, Bayesian method, Kalman filter, Markov Chain model, and gray theory were extensively used. A novel wind energy forecasting system based on the Hammerstein model was created, capable of finding various asymmetric distributions, non-stationary profiles, and chaotic dynamics. For deterministic and probabilistic wind power

forecasting, the authors developed a Bayesian-based adaptive robust multi-kernel regression model[7]. To achieve the time-series prediction of wave energy, a Kalman filter and time-varying regression technique were suggested in. The case study demonstrates that the suggested approach provides the most accurate predictions.

However, the majority of current statistical models for renewable energy forecasting are linear models, limiting their capacity to handle increasingly difficult prediction issues with longer forecasting time horizons [8]. Due to their prospective capacities for data-mining and feature-extracting, artificial intelligence-based forecasting models constantly offer a more promising performance than physical methods and statistical approaches as soft-computing techniques advance. To manage the nonlinear connection between input and output through error reduction, support vector machines, artificial neural networks, extreme learning machines, and adaptive fuzzy neuron networks were often used. To conduct real-time forecasting of carbon pricing in Shenzhen, a hybrid of mixed data sampling regression and back propagation neural network was created, resulting in improved performance. The authors proposed a weather classification model based on generative adversarial networks and convolutional neural networks for day-ahead photovoltaic power forecasting, and it was discovered that weather classification is crucial in determining the most efficient photovoltaic power forecasting model.

A novel wave energy forecasting methodology based on artificial neural networks (ANN) has been suggested. Historical wave height and weather data from the wave measuring station are inputs to this framework. The present peak height of the wave energy is the output. On the basis of measurement data from China's east coast, the correctness of the forecasting system was confirmed. In, a comprehensive comparison of current renewable energy forecasting models was presented, demonstrating that each model had benefits and drawbacks. As a result, the articles in the fourth category propose how to combine several forecasting methods in order to maximize the benefits of each method individually. To combine forecasting accuracy with parameter stability, a hybrid forecasting system including a denoising approach, a multi-objective differential evolution algorithm, and a fuzzy time series method was created. To explore the large multi-step wind speed forecasting performance, a hybrid approach based on wavelet packet decomposition, Elman neural networks, and boosting algorithm was developed. Furthermore, wavelet decomposition and the least square support vector machine were utilized to greatly reduce the unpredictability and stochasticity in wind energy. The authors suggested a novel machine learning framework for forecasting major wave heights in Australia's eastern coastline region based on extreme learning machines and empirical model deconstruction. This framework may be seen as a useful decision-making tool, and it is essential for the development of dependable ocean energy converters [9]. The aforementioned techniques for renewable energy forecasting, on the other hand, often use shallow models as its learning principles. Neural networks having just one hidden layer or no hidden layer are known as shallow models. In the 1980s, shallow models were suggested to learn statistical principles from a large number of training samples in order to predict unknown occurrences. Back propagation algorithm, support vector machine, Boosting, and maximum entropy techniques are examples of shallow models. The training of shallow models, on the other hand, requires a great deal of knowledge and expertise. Furthermore, superficial model theoretical analysis is challenging. As a result, shallow models have significant practical constraints. To put it another way, shallow models have at least three major flaws: (1) Feature selection done by hand [10].

DISCUSSION ON FORECASTING OF RENEWABLE ENERGY

To manually choose features from renewable energy data, shallow learning algorithms need adequate previous knowledge of the issue area. Because the time-consuming feature selection procedure is heavily reliant on human experience and therefore inaccurate, shallow models are ineffective for detecting nonlinear features and high-level invariant patterns in renewable data.

(2) Limited capacity to generalize. Shallow models have been shown to excel in approximating smooth target functions. However, due of the noisy surroundings and chaotic nature of the weather system on Earth, renewable energy data is intermittent, stochastic, and highly variable, adding non-smooth features to the forecasting target function.

As a result, shallow models with limited generating capabilities may be ineffective in learning complicated patterns in renewable energy data. The number of samples. When the training dataset is tiny, shallow models perform effectively. The widespread deployment of environmental meters, remote sensors, and other related technologies, on the other hand, ushers us into the age of big data, with the training data trending exponentially higher. As a result, shallow models may experience network instability. Renewable energy forecasting has recently remained a hot topic in the literature, with many review articles being published. Forecasting PV power production approaches using time-series statistical, physical, and ensemble methodologies. The writers gave a comprehensive review of different methods for solar power forecasting over a relatively short time horizon to the readers. A survey on wind energy ramp forecasting, which is useful for achieving large-scale wind energy integration. Furthermore, the state of the art in wind and solar energy forecasting has been thoroughly examined from the viewpoints of cooperative and competitive ensemble techniques. The impact of solar and wind energy forecasts on electrical power and energy systems has been analyzed, as well as their operating costs and benefits. The authors examine the development of sea wave energy operation prediction in terms of energy balance, as well as statistically evaluate the dependency of wave and thermal energy by delving into the input function of wind energy.

Despite the fact that relevant research has exploded in recent years, the evaluation of renewable energy forecasting from the viewpoint of deep learning has yet to be addressed. As a result, the purpose of this article is to bridge that gap. The primary contribution of this article, in comparison to other research on comparable subjects, is to evaluate renewable energy forecasting literature from the perspective of deep learning-based techniques. We categorize the fundamental architecture of deep learning, as well as the related training processes, into four categories: deep belief networks, stacking auto-encoders, deep recurrent neural networks, and others. We look at how deep learning-based models may help in forecasting. Existing approaches are summarized and analyzed, such as data preprocessing and error post-correction procedures. We also talk about existing research projects, difficulties, and possible future research paths. The following is a breakdown of the paper's structure. A basic overview of deep learning-based renewable energy forecasting, as well as its categorization. A summary of the most often utilized deep architecture for deterministic and probabilistic renewable energy forecasting is provided. Several methods for improving accuracy are presented. We also discuss the statistically promising performance of deep learning-based techniques, as well as potential obstacles and future research areas. This section explains the fundamentals of deep learning, which is important for improving forecasting accuracy for renewable energy sources. In general, three major kinds of deep learning were widely used in the literature: stacking auto-encoder, deep belief network, and deep recurrent neural network. Forecasting models based on stacked extreme learning machines, deep reinforcement learning, and deep convolution neural networks have also been described. We'll now go over their fundamental architecture and the training processes that go with them.

Only the latent information in the hidden layer is used in the decoding process to recreate the inputs, suggesting that the latent variables already retain a lot of information from the input. As a result, the encoder and decoder's nonlinear transformation may be regarded as a sophisticated feature extractor capable of maintaining latent abstractions and invariant structures in input. After then, an SAE is created by discarding the decoder and stacking the encoders hierarchically. The first layer of an SAE is trained as an independent AE, with the input serving as the training

dataset. When the first auto-training encoder's process is over, the first AE's hidden layer and the second hidden layer are regarded as a new AE. The training procedure is same to that of the first AE. Multiple auto-encoders may be layered hierarchically in this manner by executing the encoding rule of each layer in a bottom-up order, and an SAE is formed as a result. Previous research has shown that SAE offers promising and stable performance for high-level feature abstractions and representations, which is useful for renewable energy forecasting. In recent years, several forecasting models based on SAE have been created. The term "deep recurrent neural network" comes from the term "recurrent neural network," which is a kind of artificial neural network in which nodes are connected to form a directed graph. It uses feedback connections to remember the brain states at earlier time steps to simulate the temporal dynamic behaviors seen in time series data.

Feed forward neural networks are a common RNN structure. RNNs may utilize neural internal states to analyze time series sequences of inputs, making them suitable for renewable energy forecasting. Deep RNN may be expressed in four distinct ways when compared to ordinary RNN. The first method is to deepen the input-to-hidden function to learn additional non-temporal structure from the inputs. This formulation, as opposed to the original inputs, tends to flatten the manifolds around which the data concentrates and untangle the underlying variation components. Because the connection between representation characteristics can be represented more simply, the deep input-to-hidden structure enables learning the temporal association between many time steps simpler. The second concept of deep RNN is to deepen the hidden-to-output function, which allows for more compact hidden states. The most significant advantage of this formulation is its great efficiency in summarizing the history of prior inputs, making real-time output prediction simpler. The third kind of deep RNN is the deep hidden-to-hidden transition. It adds a new data source to the previous inputs, which are represented by fixed-length concealed states. The hidden-to-hidden transition enables the hidden layers to quickly adjust to changing input patterns while maintaining a meaningful summary of previous data. The deep hidden-to-hidden transition's primary benefit is its universal approximation feature. The fourth kind of deep RNN is created by stacking several recurrent hidden layers on top of each other.

Each stacked layer is encouraged to function on a distinct timeframe by this arrangement. To put it another way, stacked RNN can deal with various time scales in a single input sequence. The four most common deep RNNs are shown in this diagram. For renewable energy forecasting, several deep RNN models have been suggested. Deep RNNs, on the other hand, may increase computing complexity, particularly when time series data has large tails. Adopting recurrent and convolutional operators for model building is one viable approach. Another option is to utilize bidirectional computations, which may account for the effects of both past and future situations. Additional stored states in a deep RNN may be controlled directly by the neural network. Furthermore, another neural network with time delays or feedback loops may be used to replace the recorded states. Long short-term memory networks and gated recurrent units rely on such regulated storages. They both have distinct temporal dynamic behavior and may alleviate the issues of bursting and disappearing gradients. As a result, for renewable energy forecasting, extended short-term memory and gated recurrent networks show promise. The substantial anomalies in terms of uncertainty and volatility add to the difficulty of renewable energy forecasting. The decomposition signal, according to the prior study, is made up of three parts: (1) A regular pattern used to characterize the inherited periodic signal from previous samples. Because of its predictability, it is a key component that can be precisely anticipated. (2) Uncertainty is a non-periodic component produced by external variables such as weather and climate. Because this component is influenced by random variables, it is difficult to anticipate. (3) Noise as a physical component that cannot be explained.

Because it is unexpected, this word is often overlooked and dismissed. Clearly, the examination of highly nonlinear, complicated relationships and correlations in data is required for predicting uncertainty, which may go beyond the conventional shallow learning paradigm. On the contrary, prior research have shown that deep learning algorithms have a tremendous approximation capacity to extract deep nonlinear characteristics in data, making deep learning ideal for renewable energy forecasting. The most significant advantage of deep learning architecture is that it can learn renewable energy data characteristics in a hierarchical manner. The neural network design learns the characteristics at various sharing levels at different layers. Typically, higher-level characteristics are learnt as a mixture of lower-level traits. Deep learning techniques, in general, may be utilized as feature extractors in an unsupervised way. The discovered characteristics are useful in renewable energy forecasting. All of the algorithms have been presented. Deep learning characteristics are not immediately applicable to renewable energy forecasts. To translate the nonlinear characteristics into the final forecasting findings in a supervised way, a regression procedure is needed. In the regression process, linear regression, nonlinear regression, and even neural networks may be utilized. By fitting a linear equation to the observed data, linear regression models the connections between the dependent variable and the explanatory factors. The linear equation depicts the relationship between the mean response and the explanatory factors. Nonlinear regression is a kind of regression analysis that uses statistics. The data are expressed as a nonlinear function whose parameters are determined by the explanatory factors in this approach.

CONCLUSION AND IMPLICATION

This article offers a thorough evaluation of current deep learning-based renewable energy forecasting models. A multi-layer perceptron with many hidden layers is what deep learning is. It combines low-level characteristics to create more abstract high-level features or characterizes attribute categories to learn about the input data's fundamental nature. Deep learning-based forecasting models are divided into five categories in this paper: DCNN, DRNN, DBN, SAE, and additional deep learning models. Each kind of forecasting model is described in depth. In addition, various data preparation and post processing methods are discussed in this article in order to enhance prediction accuracy. The article then goes on to provide a significant number of simulation results that demonstrate the feasibility and efficacy of deep learning-based forecasting models. Finally, we go through some of the difficulties that deep learning-based prediction models face, as well as some of the future research areas that might be pursued. This article's comparative analysis may aid renewable energy forecasting experts in determining which deep learning algorithm can help them improve their forecasting tools. This article fills in the gaps in order to explore the possibilities of deep learning in the context of renewable energy forecasting.

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A REVIEW IMPACT OF SOIL EROSION ON AGRICULTURE

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ABSTRACT

Soil erosion is a global issue that has a negative impact on agriculture. Soil erosion causes topsoil degradation, resulting in a decrease in soil productivity. The balance between soil farming and depletion is critical for long-term agricultural sustainability. Soil erosion is caused by a variety of causes, including deforestation, overgrazing, and the use of agrochemicals, among others. Crop production has been hampered by soil erosion, a shortage of water, and nutritional deficiencies. Various methods, such as vegetation, mulching, matting the soil, bunding, reducing irrigation, and jetties, may be used to minimize soil erosion and increase crop yield. This review article focuses on the effect of soil erosion on agriculture in this respect. Soil erosion has a negative impact on crop productivity in a variety of ways, including nutrient loss, soil depth, and water availability. Soil erosion may be avoided in the future by using appropriate land management techniques.

KEYWORDS:*Agriculture, Land, Organic Matter, Soil Erosion, Water, Wind.*

1. INTRODUCTION

By removing soil from land surfaces, erosion depletes the viability of all natural habitats, including agricultural, forest, and pasture ecosystems. Soil erosion, water shortages, climate change caused by carbon pollution, eutrophication of fresh water and underwater shorelines, and habitat loss are among the world's most pressing environmental problems. According to reports, almost 66 percent of the world's population is malnourished, the highest number of malnourished individuals ever recorded. More food will be required when the world's population surpasses seven billion people, with a predicted 9.3 billion by 2050. Consider that over 99.7% of human

food (calories) is processed on the land, while less than 0.3 percent of marine and aquatic food (calorie) is. For all agricultural soils, productivity and quality are critical to the preservation and growth of global food supply. For many years, human-induced soil degradation and the consequent damage to all agricultural land has resulted in a reduction in the productivity of the remaining land, which has been somewhat countered by nitrogen and phosphate fertilizers, culminating in the abandonment of productive agricultural soil. Soil erosion results in the loss of farmland, which necessitates the processing and application of nitrogen and phosphate enzymes to new cropland, as well as new cultivations from forest and pastureland. Soil erosion also reduces the number of important plant, animal, and soil microbes [1], [2].

Soil degradation is agriculture's biggest foe, posing a significant environmental threat to long-term sustainability and development, as well as the impacts of the climate and food security crises. This is especially true in places where there are major issues, such as watersheds in Indonesia, India, the Philippines, and other countries. By using sustainable land management to prevent soil erosion, these places may solve a variety of issues. Soil depletion may include things like erosion, compacted soil, low organic matter, a lack of soil structure, inadequate internal drainage, salinization, and acidity issues. Other kinds of soil loss also result in soil erosion, but this is more severe in them. Soil deterioration is a common phenomenon in nature. Soil erosion is caused by water and wind, and each year they contribute to a considerable quantity of soil depletion throughout the world. Soil erosion may be a gradual, undetected process or it can happen quickly, resulting in significant topsoil loss. Reduced agricultural production capacity, lower surface water productivity, and deteriorated irrigation networks may all contribute to land depletion. The effect of soil erosion on agriculture and the many variables that induce soil erosion were addressed in this review article. How do these variables contribute to soil erosion, which has a negative impact on agriculture [3], [4].

2. SOIL EROSION AND ITS CAUSES

Soil erosion is a gradual process in which soil particles are separated by water or wind, allowing the soil to degrade. As a consequence of deforestation and surface runoff, soil erosion and poor water quality have become significant problems all over the globe. The situation may deteriorate to the point when the land cannot be cultivated and must be abandoned. Many agricultural civilizations have perished as a result of mismanagement of land and natural resources, and the history of such civilizations serves as a stark warning to preserve our natural resources. Soil erosion has the potential to harm agriculture by reducing crop production and quality. In a time when the world's population is increasing, the agricultural industry is under pressure to produce enough food to support our modern society. On the other side, climate change and deforestation cause soil erosion, which reduces agricultural output across the globe [5], [6].

2.1. Soil Erosion Causes:

The only way to prevent erosion is to have a permanent surface covering on the soil surface, such as trees, pastures, or prairies. In contrast to early forest soils, soils in grassy fields and agricultural regions are less capable of sustaining and are more susceptible to erosion. There are more floods in these soil regions because their water absorption capacity is decreased (and their commercial, social and environmental effects). Soil erosion is caused by a variety of causes. The four main causes are shown in Figure 1.

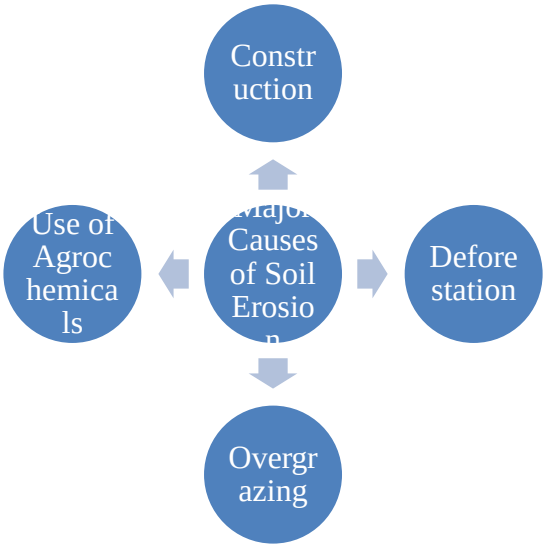

Figure 1: Schematically illustrates the major causes of soil erosion

2.1.1. Deforestation:

The population is increasing demand for goods like as coffee, soybeans, palm oil, and wheat, which is clearing space for cultivation. Unfortunately, it increases the risk of native trees eroding and being replaced by new trees that do not always cling to the soil. Agriculture would be jeopardized if topsoil (the soil's most nutrient-dense layer) was eroded over time.

2.1.2. Overgrazing:

Overgrazing is caused by continuous bovine growth. Animals are flattened and compressed because plants have little time to recover. Topsoil sediments are taken away during this process. On the other hand, the remaining soils may lose their penetration capability, resulting in additional climatic water loss.

2.4. Agrochemical Application:

Pesticide and fertilizer chemists are a popular method for farmers to boost their profits on (typically monocultural) crops. Overuse of phosphoric chemicals, on the other hand, promotes the growth of harmful bacteria, leading in an imbalance of soil moisture in the microorganism. If the soil deteriorates, the risk of floods rises, and sediments wash away in rivers and adjacent regions (due to wind and water behavior), contaminating the local living environment. Farmers utilize tillage techniques to prepare crops by adding chemicals and fertilizers, as well as soil leveling and invasive crop removal to grow them. This is not only correct, but also very important. Because tillage changes the soil's composition, it accelerates soil erosion and surface runoff.

2.5. Recreational and construction activities:

Buildings and roads that prevent water from flowing freely contribute to surface deterioration. Rather of speeding up deforestation, it is flooding adjacent areas. Furthermore, motor sports such as motocross harm the environment, alter it (albeit to a lesser extent than other factors), and degrade soil.

3. IMPACT OF SOIL EROSION ON AGRICULTURE

Soil erosion is a slow process in which the soil is eroded and separated by water or wind, causing the soil to degrade. Erosion and surface runoff have caused substantial soil loss and poor water quality throughout the globe. The situation may deteriorate to the point when the land cannot be cultivated and must be abandoned. Because of mismanagement of land and natural resources,

many pastoral cultures have perished, and the history of such civilizations serves as a warning that our natural resources must be preserved. Erosion is a significant issue that affects both productive agriculture and water quality. To enhance water and soil quality, sediment control must be a component of every soil management strategy. Topsoil eroded by wind or water may be carried via streams and other rivers. Land erosion produces sediments, which is mostly produced by sheets and rill erosion in highland areas, and to a lesser extent by cyclical erosion of slopes and drainages [7], [8].

Crop yields are decreased as a consequence of soil erosion. In order to decrease water infiltration and storage, soil erosion enhances water flow. Water flow is increased by soil erosion. Furthermore, the erosion process removes organic matter and vital plant nutrients from the soil. These enhancements not only decrease vegetative production, but they also reduce the presence of important biota and soil biodiversity. Because these factors interact, it's almost difficult to separate their distinct impacts. These elements are explored more below:

3.1. Availability of Water:

Water is a major productivity limitation in all terrestrial environments since all plants needs enormous amounts of water to grow and produce fruits. For example, in a three-month growing season, a hectare of maize would use approximately seven million liters of water and lose another two million liters to the soil. Water drainage is very important because precipitation drains the surface, reducing water penetration into the soil.

4.2. Nutrient Depletion:

Plant nutrients such as nitrogen, phosphorus, potassium, and calcium are carried by eroded soil. The leftover soil usually maintains three times as many nutrients per unit weight as the deteriorated soil. Fertile topsoil contains 1 to 6 kilogram of nitrogen, 1 to 3 kg of phosphorus, and 2 to 30 kg of potassium per ton, whereas eroded topsoil has 0.1 to 0.5 kg of nitrogen per ton. A high amount of fertilizer is also used to compensate for nutritional deficiencies in crop production. Commercial fertilizer and/or cow manure may replenish the nutrient base when the soil base is approximately 300 mm deep and only 10-20 tons of ground per acre per year is lost. However, implementing a replacement approach is costly for both farmers and the economy, and most impoverished farmers cannot buy fertilizer. Not only are fossil-fuel fertilizers reliant on fertilizers, but they may also harm human health by polluting soil, water, and air.

3.3. Organic Matter in the Soil:

The amount of organic matter in rich soils is about 100 tons per hectare (4 percent to 5 percent of total topsoil weight). 95 percent of nitrogen and 25 to 50 percent of phosphorus are found in organic matter in the soil. Erosion significantly decreases organic soil since most organic soils reside as rotting leaves and stems near to the earth's surface. Wind and water erosion remove fine organic particles from the soil, leaving bigger soil and rock particles. Several studies have shown that soil that has been dissolved by water or wind is 1.3 to 5 times richer than soil that has been left in organic materials. For example, decreasing organic soil content from 0.9 percent to 1.4 percent (assuming organic soil content is 4 percent to 5 percent) reduced grain crop production capacity by 50%.

Soil organic matter is a significant resource because it helps in the formation of soil aggregates, which improves soil porosity. As a consequence of the enhanced soil structure, water penetration improves and the soil's total productivity rises. Organic matter also aids in the exchange of caution, the development of plant roots, and the proliferation of soil microbes. The ecosystem's productivity declines when the organic matter layer is depleted, as measured by plant biomass, due to deteriorated soil composition and nutrient losses. In addition to low yields, overall biomass and biodiversity of biota have decreased significantly in these environments.

3.4. Depth of Soil:

Growing plants need soil that is deep enough for their roots to reach. Various soil biota, such as earthworms, need a certain soil depth. This implies that when erosion lowers soil depth from 30 cm to less than 1 cm for shallow soils, root space will be reduced and plants would be stunted.

4. PREVENTION OF SOIL EROSION

Soil erosion is a concern not just because it affects plant development, but also because it has an impact on water quality. Soil is an important natural resource that, among other things, nourishes and encourages plant development. When soil is left uncovered and exposed, it will be eroded by wind and water. There are a few methods that may be used to avoid soil erosion [9], [10].

4.1. Vegetation:

The simplest and most natural method to prevent soil erosion is to plant plants. Because bare-earth soil erosion is more severe, the soil must be maintained covered by planting and growing grass. Water is slowed by the grass, which keeps it from coming into direct touch with the surface. Plants produce root systems that aid in soil stabilization and erosion prevention. Plants shield rain and reduce the impact of the drop on the soil via their leaves, preventing the soil from being split apart.

5.2. Mulch Application:

Mulches are another method to keep soil from eroding. Mulch on the soil surface aids in the gradual absorption of water while also protecting the soil from rain and correcting pH levels. Mulching is made from dead leaves and broken wood that fall to the ground and cover the soil. Mulching protects trees and plants from the elements. Mulching allows water to slowly reach the land, reducing the impact of heavy rain or irrigation. Mulches help to keep the soil from becoming acidic and to keep weeds at bay. Mulches produced from organic materials decompose over time, improving soil structure and fertility.

4.3. Soil Matting:

Matting is used to add biodegredients to the soil, such as mulch, straw, cacao, and wood chips. These are kept in place with the use of biodegradable coconut netting. The proper method for burying a biodegradable tapestry. The matting material decomposes or slows down decomposition, eventually becoming a soil fertilizer.

4.4. Construction of Retaining Walls:

It's conceivable that sloping terrain may revert to its previous state before stabilizing. The slope's bottom supporting wall will keep the dirt from creeping and delaying the collapse. The retaining wall frequently prevents water leaks. More erosion is caused by runoff water, which may be mitigated by a stone or concrete wall.

4.5. Integrate Hillside Farming with Contour Farming:

On sloping terrain, soil erosion is more frequent. On the steepest slopes, cultivating is almost impossible. Divide the hill into terraces that wrap around the slope to prevent soil erosion. To prevent soil erosion, the dirt should be placed evenly down the slope. Contour agriculture acts as a buffer, catching and retaining rainwater for increased infiltration and more consistent water supply.

4.6. Bunding:

A bund is an erosion-prevention method that involves placing a barrier on the surface rush to restrict water flow. It aids in the management of soil depletion caused by runoff buildup in the watershed. The contour channel may be excavated in the same manner on both sides of the river. Contour linkages are formed in low-precipitation regions with porous soils.

4.7. Reduce the amount of water you use:

Soil erosion may occur when a garden or field is overwatered. Whenever possible, use less water. The safest approach is to use a drip irrigation system. A drip system provides just a little amount of water at a time and no water runs over the surface to maintain top soil.

4.8. Avoid Compaction of the Soil:

The earth is compacted into a thick layer by people, animals, and machinery all pressing down on it. As a consequence of compaction, the spacing between soil particles shrinks. Water and oxygen have a difficult time reaching the soil as a consequence. As a consequence, rather of stomping the ground, a moving path made of paving stones should be constructed.

4.9. Creation of Windbreakers:

Evergreen trees are planted around gardens or farms in this technique to prevent the soil from blowing away. Windbreakers protect plants from wind damage while also increasing their efficiency and output. Humidity is considerably higher in a crop that is sheltered from the wind.

4.10. Groins:

Sand is carried down the beach by longshore drift, and groins are man-made structures designed to collect it. Longshore drift is a mode of transportation. It refers to the movement of eroded debris along a shoreline. Groins are long, walk-like structures built on beaches that extend into the water perpendicular to the coastline. They prevent longshore currents from flowing. The long beach current loses pace as it reaches its groin, which consists of sand dumps and silt on the current side of the wall. While the sand on the upstream wall is being caught, the waves are picking up sand and gravel on the downstream side.

4.11. Jetties:

People rushing around the sides of the entry generate jetties, which are barriers. The goal of the jetty construction is to keep the Inlet open forever and prevent it from moving. This approach necessitates the construction of a lengthy system that runs parallel to the sea. They are usually made of stone, cement, steel, or wood and are used to keep sand out of a ship's passage. Beach should be spread over the sand on the current side of the jetties to reduce erosion even further. On the downstream side of the jetties, erosion continues.

4.12. Breakwaters:

Breakwaters are made up of large rock piles that run parallel to the beach. Breakwaters are usually utilized to cool the waters in ports and manmade marinas. It serves as a wave barrier, allowing the beach to expand while preventing erosion. As waves slam against the barrier, they discharge their sediment burden. On the other hand, any portion of the coast that isn't covered by the breakwater starts to deteriorate.

5. DISCUSSION

Soil erosion occurs when soil particles loosen or wash away in valleys, oceans, rivers, streams, or distant regions. Agriculture and deforestation, for example, have worsened the problem. Soil erosion is a constant process that may happen slowly or quickly. It causes, among other things, a gradual loss of topsoil, ecological degradation, and soil collapse. Increased rainfall rates are the primary cause of soil erosion. Raindrops scatter the dirt, which is carried away into nearby

streams and rivers. Soil depletion is common in regions with heavy and regular precipitation. During floods, the rushing water erodes a lot of soil, causing potholes, rock-cut tanks, and other problems.

As the most productive portion of the soil profile, soil erosion depletes the top soil for agriculture. In the lack of top soil, yields are decreased and production expenses are increased. Erosion may cause erosion because high soil is lost, making paddock expansion harder. Erosion in croplands leads in exposure to water and nutrients, poor physical and chemical characteristics of the subsoil, higher ripples, water and other nutrients for crop development, depletion of freshly planted crops, and silt deposition in lowland regions. Erosions may also lead to a decrease in the amount of water and nutrients contained in the soil.

6. CONCLUSION

Soil erosion is a natural occurrence that may occur on any kind of terrain. Soil erosion is a frequent physical force in agriculture caused by water and wind, and is related to agricultural operations such as tillage and wearing down a top-soil region. Soil separation, redistribution, and absorption are three distinct processes involved in erosion, whether caused by water, wind, or the preparing of ground for growing crops. Top soil, which is high in organic matter, fertility, and soil life, is either moved on-site to grow over time or transported "off-site" to fill drainage ditches. Soil erosion lowers agricultural production and pollutes rivers, lakes, and streams in the area. Soil erosion may be a gradual, undetected process or it can happen quickly, resulting in significant topsoil loss. Other severe soil depletion characteristics that may speed up the erosion process include soil compaction, low organic matter, and lack of soil composition, poor internal drainage, salinization, and acidic conditions. It is suggested that appropriate land management methods be used to avoid soil erosion by taking into account all problems connected to soil erosion. It is necessary to investigate how small farmers may become more aware of soil erosion and how to avoid it.

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ON BINARY STRUCTURED SPEECH PRODUCTS IN FRENCH

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ABSTRACT

The theory of structuralism introduced the linguistics of Uzbek at the end of the last century by following the relationship of linguistics and the problematic of the theme chosen in this article it is about the analysis of the binary construction in the discourse that allows to gather among all these elements phrases in the syntaxes of the French-Uzbek language.

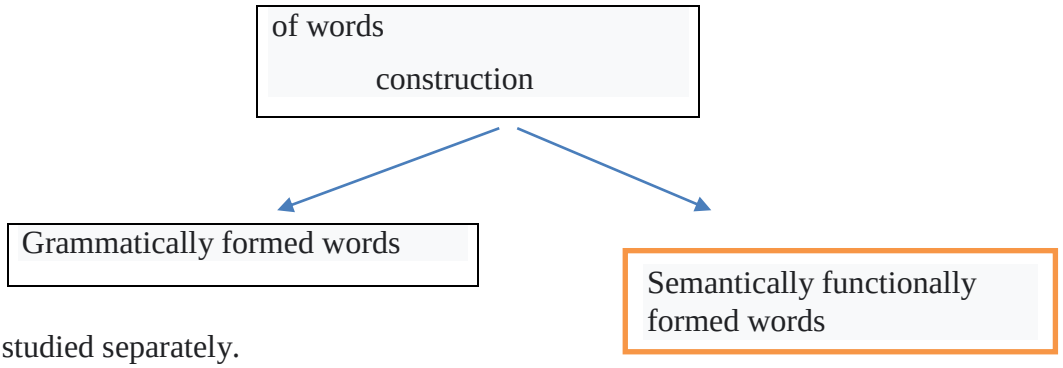
KEYWORDS: *System-Structural Linguistics, Modal, Exclamation, Affirmation-Denial, Suggestion-Address, Binary Construction, Component, Boundary Comparative Linguistics, Opposition, Relative.*

INTRODUCTION

In the latest research of Uzbek linguistics, the doctrine of system-structural linguistics created in Europe and its theorists (V. Humboldt, F. de Saussure, S. Balli, G. Guillaume, K. German, J. Dubois, R. Jacobson, A. Tenyer et al.). It aims not only to emphasize the advantages of the methods of system-structural linguistic analysis, but also to bring advanced linguistic theoretical views into the Uzbek language and use them in the most effective and comparative-typological aspects. It is no coincidence that Humboldt said almost two centuries ago, "Every language has its own system, and a linguist must study it." In recent years, the methodology of dialectical laws of linguistic and speech phenomena has undergone a deeper analysis of problematic issues at all levels of linguistics. A real "Turkish delicacy" is beginning to be felt in all parts of the Uzbek language, and it is thanks to our independence that serious efforts have been made to free it from "excessive grammatical burdens." Indeed, language and speech are very complex in their content and the relationship between them. This doctrine is also important for the work we are studying.

MAIN PART

In the same direction in Uzbek

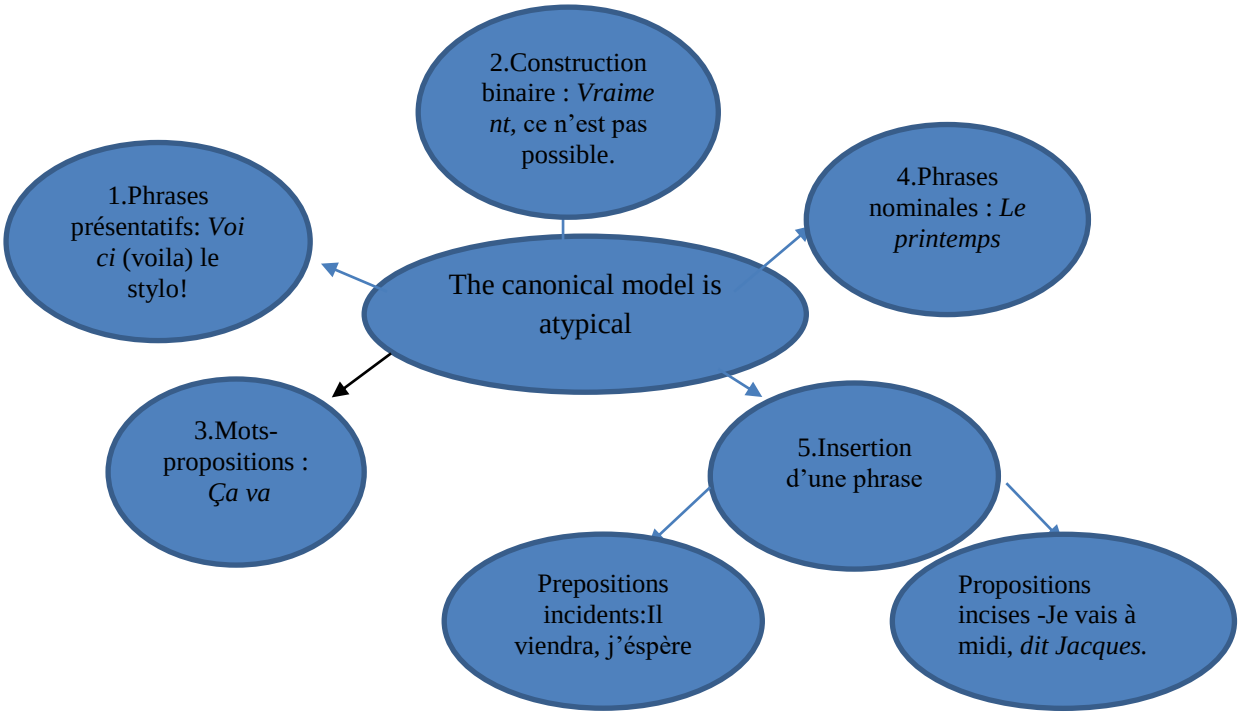


were studied separately.

In the latest scientific literature in French: 1. Typical 2. Atypical sentences are distinguished from each other.

The canonical model is used as an atypical phenomenon for the construction of speech in modern French literary language, and it can be contrasted with typical sentences.

The canonical model is an atypical statement:



Atypical sentences in Uzbek can be compared with ssemantically, functionally formed words. In the syntactic framework, the features of ssemantically functionally formed words are limited, such as the fact that they do not require a grammatical form, in other words, the inability to semantically communicate, are not considered part of speech and are not connected with parts of speech. In French, however, these signs are not fully justified. Recent studies have shown that constructive, nominative, author's, introductory, and adverbial sentences, which do not occur in SFSHSGs, have a canonical model (separate construction). . Due to the nature of the dichotomy

of language and speech, the minimum grammatical pattern of speech differs sharply in French and Uzbek. The same situation is observed in the formal structure of sentences (passive subordonnée form, building constructions, les énonces à un seul terme, l'emphase, mots-propositions in separate sentence types).

Semantically and functionally formed sentences usually consist of modal, adverbial, affirmative, negative, and adverbial words. These are given in the symbol (WP) as opposed to grammatically formed words, which are (WPm) stereotypes.

Indeed, there are also lexical units that have the ability to be spoken between French lexicon and syntax. Their lexical-semantic and syntactic features have not yet been scientifically determined. However, we seek to provide scientific information on the lexical-semantic and functional properties of binary constructed sentences, acknowledging that the ontological features of the semantically functionally formed words mentioned above are also reflected in the canonical model of atypical sentences.

French linguists thought about the problems of binary opposition in the first half of the twentieth century. For example, Anre Martine, a professor at theSorbonne University and one of the founders of functional linguistics, in his work on lexicology, La linguistique synchronique, provided interesting evidence for the emergence of binary opposition in relation to process and object.

For example, the binary contradiction between the expression of the meaning of the table (table) in the form of "table" and the expression [tabl] is reflected in the linguistic conflict. The scientist's conclusion is that binary opposition is manifested in the relation of "sign and determinant" (le signifié et le signifiant). That is, this relationship is important for the observation of lexical units in the speech process.Although binary construction is essentially inextricably linked to binary opposition; it differs markedly in some respects. What is the difference?

1. In the syntactic construction of lexical units, that is, in the acquisition of a functional essence.

2. A lexical unit expresses a lexical meaning while retaining its essence in binary opposition. In binary construction, syntactic construction is more important than lexical meaning.

3. In the form structure of syntactic construction. A lexical unit or lexical device in a speech function is essentially specific to a particular type of speech.

For example, the primary function of a group of horses in a binary construction is explained by the fact that they are nominal. Its expression by prepositional determinants is related to the incomplete sentence. When we say formal structure of syntactic construction, we mean what kind of sentence it belongs to. In the textbooks of Grammaire métodique du français (2) by Martin Regel, Jean-Christophe, Relat and Rene Reyol, the term "binary construction" is used as a lexically and syntactically separate "component" (relative sense). We have to admit that. (The term "binary construction" or "binary construction sentence" is not listed as a separate sentence type). In it, the terms "binary opposition" and "binary construction" have two different meanings: 1) lexical semantic; 2) studied in the syntactic and stylistic plan. A binary structure with a distinct linguistic structure is an important speech phenomenon for SFSHSG (semantically-functionally formed simple sentences). The study of these is important for comparative typology and theoretical gammatics.

An analysis of the French language shows that many sentences can consist of two relatively independent parts. Such passages create opposition in the speech. But they do not take into account the logical judgment inherent in the speech. On the contrary, the content of the first part of the opposition is interpreted in relation to the content of the second part, and the connection

with this content is equivalent to a complete idea. The main reason for this is that the simple statement is in binary opposition. In other words, simple sentences from French form relative (independent) two-component sentences when they switch to binary opposition. In them, even when the components appear to be two, the logical judgment is one and loses the cross-sectional area.

Binary opposition of a simple sentence	**The normative structure of a simple sentence**
Belles, les filles!	*Les filles sont belles.*
Magnifique, ce tableau !	*Ce tableau est magnifique.*
Drole, cette histoire !	*Cette histoire est drole.*
Delicieux, ce plat !	*Ce plat est delicieux.*
Dangeureux, ce pont.	*Ce pont est dengeureux.*
Capricieux, cet homme.	*Cet homme est capricieux.*
Claire, votre explication !	*Votre explication est claire.*
Heureux, les pauvres !	*Les pauvres sont heureux.*
Artificiel, son rire.	*Son rire était artificiel.*
Beau, le temps !	*Le temps est beau.*
Autobiographique, le roman.	*Le roman est autobiographique.*
Aveugle, cette femme.	*Cette femme est aveugle.*
Aviateur, son fils.	*Son fills est aviateur.*
Jaloux, mon mari.	*Mon mari est jaloux.*
Pardonnable, ce garçon.	*Ce garçon est pardonnable.*
Nombreuse, sa famille.	*Sa famille est nomreuse.*
Inutilisable, sa voiture.	*Sa voiture est inutilisable.*
Unique, sa fillette !	*Sa fillette est unique.*
Cacochyme, ce malade.	*Ce malade est cacochyme.*
Faible, ce boxeur.	*Ce boxeur est faible.*
Fantastiques, tes idées !	*Tes idées sont fantastiques.*
Flegmatique, cette personne !	*Cette personne est flegmatique.*
Compréhensible, cette règle !	*Cette règle est compréhensible.*
Rapide, ce moto!	*Ce moto marche rapidement.*
Prudent, ce chauffeur.	*Ce chauffeur conduit prudemment.*
Chaleureux, l'été!	*L'été est chaleureux.*
60 degrès,la température!	*La température montre 60 degrès.*
Jeune, l'avocat!	*L'avocat est jeune.*
Beau,ce paysage!	*Ce paysage est beau.*
Ancienne, cette boucle d'oreille!	*Cette boucle d'oreille est ancienne.*
Laborieux, ces pauvres !	*Ces pauvres sont laborieux.*
Paresseux, Luc !	*Luc est paresseux.*
Charmantes,ces dames !	*Ces dames sont charmantes.*
Si tendre, son amour !	*Son amour est si tendre.*
Discutable,ce theme !	*Ce theme est discutable.*
Voyante, M.me Leblanc !	*M.me Leblanc est voyante.*
Curieux, votre fils !	*Votre fils est curieux.*

Avare,ce monsieur !	*Ce monsieur est avare.*
Gaté, cet enfant !	*Cet enfant est gaté*

CONCLUSION

It seems that in the binary opposition of a simple sentence there are no intermediate elements of syntactic connection, but the parts are known and interconnected by a certain pause (tone). French linguists Martin Regel, Jean-Christophe, Pellat, and Rene Reul have commented on binary constructions. It should be noted, however, that it is confused with other types of simple sentences, such as incomplete sentences and types of words. In our opinion, binary constructions can be considered as a separate form of a simple sentence, and the study of its boundaries and forms is also important for comparative linguistics.

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TESOL AND TETE INTERNATIONAL PROGRAMS RECOMMENDATIONS FOR TRAINING AND ORGANIZING SUCCESSFUL LESSONS

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ABSTRACT

The article deals with the training NAD organizing successful lessons on TESOL and TETE programs. The head and instructors taught Uzbek core teachers how to train teachers to be more professional in their teaching field. The root theories of SLA teaching, strategies of teaching a foreign language, innovative methodology and many interactive activities teaching workshops had been organized by TESOL and TETE training groups that was supported by Ministry of Public Education and American Councils. According to these seminars, Uzbek teachers practice their new gained methodological skills both during the program and after it, in their practicum phase.

KEYWORDS:*TESOL, TETE, SLA, Ice Breaker, Warm Ups, Transaction, Assessment, Autonomy, Reflecting, Scaffolding.*

INTRODUCTION

In 2021, TESOL's conclusive program sessions were held in Tashkent. The head and instructors taught Uzbek core teachers how to train teachers to be more professional in their teaching field. The root theories of SLA teaching, strategies of teaching a foreign language, innovative methodology and many interactive activities teaching workshops had been organized by TESOL and TETE training groups that was supported by Ministry of Public Education and American Councils. According to these seminars, Uzbek teachers practice their new gained methodological skills both during the program and after it, in their practicum phase. Several main points of those trainings will be described and analyzed in this article.

MAIN PART 1

Ice Breakers and Warm Ups — According to TESOL group, teachers must organize some ice-breakers or warm up activities before starting their lessons. These activities help students to overcome their inhibition, energize them, helps to build good rapport and to build nice transaction from start to body of the lesson. Some offered ice-breakers were:

a)Great Wind Blows – Teacher first clearly explains the task and models it. Then starts to ask some certain question that he/she prepared beforehand. Students or trainees will answer by waving their hands not "me" or "I did". It helps to build great students- teacher rapport and break all ices and smoothly lead to active class engagement. Questions' difficulty rate depends on the students or trainees level and purpose. If its ordinary class of 5th grade they can be "Who has a red scarf", "Who has been abroad?" "Who has a pet". If they are professional teachers that have been training, trainer can ask:" Who has IELTS score?" "Who participated in sport competitions?" "Who taught more than 5 years?" and so forth. Each time, instead of answer, participants wave their hands and make sound of the great wind. In result, very cheerful, smiling, safe, comfy and relaxing language learning atmosphere will appear.

b)Ball Throw - Teacher brings a ball. All students make a circle. One student throws a ball to other students and say "My name is Olim" Second will say "Thank you Olim my name is Noza", so other will continue in this way getting know each other. Teacher throws two more balls later, which makes these rotations more difficult. The rule of a game is students should remember from whom they get a ball and to whom they throw the names of those students too. Then additional questions will appear like "Who you want to be in the future?"

2. Assessing And Assessment Tools - Assessing students is one of the burning point of teaching and confusing part for many teachers. Right assessment tool both motivates student and makes easier teacher's load. Detail-oriented assessment tools work well to evaluate. Teachers can themselves decide, choose even develop according to TESOL and TETE groups. As tasks vary, assessment tools also fit to certain tasks but not all. Some may be: tables, rubric, checklist, survey, needs analysis tool, polls, foldable, anecdotal record, benchmark, conference, end-of year test, observation, oral reading assessment, peer assessment, performance assessment, reading history, rubric, self-assessment, standardized test, writing assessment. All of those notions will be in detail described in the next article.

3. **Learner AutonomyAnd Differentiated Instructions**- This theory states that teacher must give autonomy to the students in process of studying. Also in wide terms, it4means to give a choice to students or trainees. Effective trainer or teacher should be able always give several choice tasks to accomplish because not only tastes and preferences, but also abilities differ. There was an exam scene in manual, depicting many animals including monkey, fish, bird, elephant, snake lining up in front of examiner and a tree. Examiner was asking to climb a tree. It is clear that fish or elephant can't climb on it and fail. A bird will just fly and lands on it which is cheating. Monkey can perfectly do task and enjoy it. So, this picture reminds to teachers that students also may have distinct abilities. Taking into account this, teachers or trainers should offer a variety of activities to students to choose. For example, for finals not only translating the text but also writing essay, speak on topic, make power point presentation, tape a video, write a song, write voice on recorder and so forth.

4.Reflecting - As it was stressed on this procedure and term, TETE group urged many times to use reflective skills for being professional teachers. Each lesson, after each large project we wrote reflection thoughts to this group as an assigned essential part of trainings. As this group believes, reflections make teacher work on their professional skills, get experts in their field. Reflections let teachers know where are their weaknesses and strengths, where they should stress and develop in their lessons and where they should slow down or scaffold language delivery. While reflecting and observing other's reflections, teachers can start approach to their teaching skills and critical thinking skills differently, start being multifaceted teachers. Additional to this groups suggestions, I can offer to keep a diary of reflections, tape to videos some lessons that teachers think that it was their turning point in their teaching field, enrich and edit them, issue and share with other teachers as manuals. It not only improves writing and critical thinking, but helps efficient ideas to get spread.

5. Scaffolding – This term and teaching technique is used to describe the word giving more detailed help, instruct, explain, simplify, direct, facilitate. If there is misunderstanding, teacher explains it in simplified version, models it, gives clear examples. If context is difficult and long – shortens it, paraphrases, defines new words. If textbook is authentic and hard to 'digest' – helps to understand it. Tries to give big picture of a task or instruction, or recites core meaning of an extract. Or pairs students with more intelligent one, so the first can get a help. Or distributes a dictionary, so students can dive into task himself/herself.

6. Cascading – Trainers of TESOL use this term to identify the actions of teaching and training teachers to use newly acquired methodological and innovative teaching ideas to other peer teachers so they can deliver to others. Like a pyramid, core teachers will be able to work on certain about of teachers' training of ESL/EFL teaching, while those teachers can design and deliver training programs to other more amount of teachers. So, training process gets vast and widen its horizons.

7. Quizlet - on the website quizlet.com teacher enters appropriate text and the website tools aids the teacher to make up ready quizzes, polls and questionnaire to check each module or unit that students have been studying.

8. Active Words List – Teacher provides active new vocabulary or terminology will be used in teaching the class to students beforehand both in hard and electronic copy. Students will read them and do Quizlet tests to check themselves and consolidate the new knowledge that are going to gain.

9. **Attention Getters, Energizers, TPR** – These international teacher training program trainers also proposed to use attention getters to grab student's attention to announce, give instruction or monitor, such as: clapping, using flash, whistling, showing flag, raising hands, saying one word "Teacher" students will say back "students" or teacher says "wonderful" students say "stars" back to show their response attention. These attention getters may be established as routines which saves time, motivates. Also energizers were offered to use to give students some relaxing time and make tactile-dynamic students engaged into lesson. Such as: **Tiger, bear and hunter.** In two groups students will get lined up. Students in groups come into agreement show (mime, act, play a role of) one of those animals or person above, another group shows another one. There is a rule of energizer: the tiger beats the hunter because it eats a person, the hunter beats the bird because he has an arm, the bird wins the tiger because it can fly. So, turn by turn they show these roles in gestures like by showing a paw or flying sign or by an arrow sign. After playing some, the winner group will be clarified. A lot of fun, joy, cheerful relaxed learning atmosphere will appear and teacher and students with each other can build good rapport. TPR means total physical response where students learn new words, teacher acts or students act and other will imitate or find out what has been shown.

10. Action Plans - TETE program trainers has offered to English teachers totally new idea of using action plans to train teachers. According to it, timetable will be developed. Timetable will have: a) workshop title, topics b) objectives c) learning/training activities d) assessment parts. All parts will be thoroughly planned and filled by trainer. Each activity, its objective, using methods, assessing tools, time management, training mode will be described in action plan. It looks like curriculum. Doing so, teachers will equip themselves will detailed document. Goals and objectives for each lesson and activities will enable trainer and trainees know strengths and weaknesses, gaps, needs and so forth. It also resembles to needs analysis.

11. Building Routines – If teacher helps to build routines or establish group norms in English learning classes much time will be saved, noise reduced, effective lesson management will occur. Teacher either can state them each lesson and ask students learn them by heart, or make

some colorful poster and stick them on walls, decorate with them English room so students can learn them themselves, watch them in free time for pictures and learn norms.

12. Exit Ticket - TETE trainings teach to check comprehension students, monitor them, give clear instructions and model instructions to make them lesson content as clear as possible. Mainly to consolidate learnings teachers asks to answer the question: What two things I learned from today's lesson? And take notes in their notebooks or in the separate sheet of papers that teacher distributed. When the bell rings for break, students will submit answers as exit tickets and teacher will achieve total student attention or engagement during lesson. Responsibility of filling exit tickets will make students learn at least two things during the lesson. Teacher connects their learning with ticket. Tickets can start with: I know…, I learned…, I wish …, I need…

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AN EXAMINATION OF DATA WAREHOUSES

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ABSTRACT

Data warehousing has become the most essential tool for every industry's decision makers. Essentially, data warehousing is the process of gathering and storing historical data in a single repository, referred to as a data warehouse, and then utilizing that warehouse to provide analytical findings. Being a helping hand for top-level professionals, it is always in the spotlight of the database business, presenting new difficulties on a daily basis. We provide a critical evaluation of data warehousing, as well as various types of topologies and data modeling for data warehouses, in this article. In terms of front end and backend technologies, we discussed some of the current data warehousing tools and methods available. We looked at other difficulties and concerns, as well as some of the study topics in data warehousing.

KEYWORDS: Conceptual Data, Data Warehouse, Data Model Quality Metrics, Online Analytical Processing.

INTRODUCTION

A data warehouse is a storage location for historical data from many sources. Rather than transaction processing, it is intended for inquiry and analysis. Furthermore, the data warehousing concept encompasses the tools and techniques available for data extraction, transformation, and loading, as well as an OLAP engine, client analysis tools, and other applications used to manage and process data in order to provide decision support to knowledge workers or decision makers. "A Data warehouse is a subject-oriented, integrated, time-variant, and non-volatile collection of data in support of management's decision-making process," says William Hinson, a well-known Data warehouse architect [1]. This description distinguishes the Data warehouse from other data repository systems such as relational database, transaction, and file systems.

In any business, a Data Warehouse is a step toward creating a computer system capable of analyzing patterns and assisting in crucial decision making. From past data, we may sometimes

find extremely fascinating and helpful trends that we might utilize for future planning. The traditional operational databases were designed to aid in the organization's clerical activities, while data warehouse and OLAP technologies are designed to aid decision makers (e.g., managers, analysts, etc.). As a result, new problems in the fields of data warehousing and OLAP emerge on a daily basis to meet the needs of higher-level experts [2]. The area of data warehousing has seen a lot of study and developments during the past two decades. Fig.1, illustrates the architect of a simple ware house used to store less amount of data. It was a lengthy road from an offline operational database to an integrated data warehouse, but we still have a long way to go. Currently, there are many areas in which we may improve, some of which are highlighted in this article. Data warehouses are relational environments for analyzing data, especially historical data. Data warehouses are used by businesses to identify patterns and connections in their data over time. Transactional environments, on the other hand, are used to process transactions on a continuous basis and are frequently used for order entry, financial transactions, and retail transactions [3]. They don't rely on past data; in fact, old data is often preserved or destroyed in OLTP settings to enhance efficiency. The autonomous data warehouse, which relies on AI and machine learning to remove manual chores and ease setup, deployment, and data administration, is the most current version of the data warehouse [4]. There is no need for human database administration, hardware setup or maintenance, or software installation with an as-a-service autonomous data warehouse in the cloud. The data warehouse is created, backed up, patched and upgraded, and the database is expanded or decreased automatically—all with the same flexibility, scalability, agility, and lower costs that cloud platforms provide. The autonomous data warehouse reduces complexity, accelerates implementation, and frees up resources, allowing businesses to concentrate on higher-value operations [5]. Oracle Autonomous Data Warehouse is a simple-to-use, completely autonomous data warehouse that grows flexibly, provides quick query performance, and doesn't need database management. Oracle Autonomous Data Warehouse is easy and quick to set up.

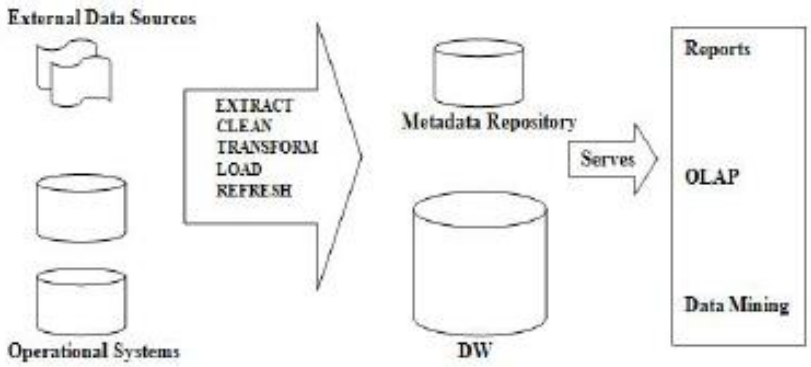

Fig. 1: Illustrates the architect of a simple ware house used to store less amount of data [6]**.**

Data warehousing initiatives still have a high failure rate, and even when they succeed, the time it takes is typically longer than anticipated. As a result, we still have a long way to go in terms of data warehousing and OLAP technology. We provide a comprehensive evaluation of data warehousing technologies in this article. We went through various types of data warehouse designs and data modeling. We looked at the data warehousing technologies and methods that are now accessible. Some of the most important research concerns are also mentioned. During the late 1980s and early 1990s, data warehousing emerged as a unique kind of computer database. The idea of data warehousing arose in response to a desire from upper management for analytical findings that a standard operational database could not provide effectively. The idea of data warehousing has gone through many basic phases as technology has improved and customer

demand has increased [7]. A data warehouse is a kind of data management system that is intended to facilitate and assist business intelligence (BI) and analytics operations. Data warehouses are designed primarily for querying and analysis, and they often store huge quantities of historical data. A data warehouse's data is often obtained from a variety of sources, including application log files and transaction programs [8]. A data warehouse is a system that collects and organizes huge quantities of data from many sources. Its analytical skills enable businesses to get important business insights from their data, allowing them to make better decisions. It accumulates a historical record over time that may be very useful to data scientists and business analysts. A data warehouse may be called an organization's "single source of truth" because of these qualities. The goal of data warehouses when they initially appeared in the late 1980s was to assist data flow from operational systems into decision-support systems (DSSs). These early data warehouses necessitated a great deal of redundancy [9]. The majority of companies have several DSS environments to suit their different consumers. Although the DSS environments shared a lot of the same data, the data collection, cleaning, and integration were often duplicated. Data warehouses developed from information repositories that supported conventional BI platforms into comprehensive analytics infrastructures that serve a wide range of applications, including as operational analytics and performance management, as they grew more efficien t[10].

DISCUSSION ON TYPES OF DATA WARE HOUSES

Iterations of the data warehouse have evolved through time to provide incrementally more value to the company. Each of these five stages has necessitated a growing number of datasets. The final three stages, in particular, highlight the need for even more data and analytics capabilities.AI and machine learning are now changing virtually every industry, service, and business asset, including data warehouses. Changes in data warehouse needs and capabilities are being driven by the growth of big data and the use of new digital technologies. The autonomous data warehouse is the most recent stage in this development, allowing businesses to extract even more value from their data while reducing costs and increasing data warehouse dependability and performance. Learn more about autonomous data warehouses and get started with your own. Data warehouses are distinct from data marts and operation data stores, despite the fact that they provide similar functions (ODSs). A data mart does the same tasks as a data warehouse, but with a much smaller scope—usually a single department or line of business. As a result, data marts are less difficult to set up than data warehouses. They do, however, create inconsistency since it may be difficult to manage and govern data consistently across many data marts.

Because ODSs are primarily used for day-to-day operations, their perspective of past data is restricted. They perform well as current data sources and are often used in data warehouses, but they do not allow historically rich searches. The cloud is used to ingest and store data from many data sources in a cloud data warehouse. On-premises servers were used to create the first data warehouses. On-premises data warehouses continue to provide many benefits today. They can provide greater governance, security, data sovereignty, and latency in many situations. On-premises data warehouses, on the other hand, are less elastic, and sophisticated forecasting is required to decide how to expand the data warehouse for future requirements. Managing these data warehouses may be difficult as well. The finest cloud data warehouses are self-driving and completely managed, allowing even novices to build and utilize a data warehouse with only a few clicks. Running your cloud data warehouse on-premises, behind your data center firewall, which meets with data sovereignty and security standards, is a simple approach to get started with your migration to a cloud data warehouse. Furthermore, most cloud data warehouses operate on a pay-as-you-go basis, allowing clients to save money. Distinct users throughout the company have different requirements for a data warehouse, whether they're part of the IT, data engineering, business analytics, or data science teams.

A contemporary data architecture satisfies these many requirements by allowing users to handle all kinds of data, workloads, and analysis. It is made up of architectural patterns that have all of the essential components integrated to operate together in accordance with industry standards. When creating a data warehouse, a company must first define its particular business needs, agree on the scope, and develop a conceptual design. The data warehouse's logical and physical designs may then be created by the organization. The logical design focuses on the connections between the items, whereas the physical design focuses on the most efficient storage and retrieval methods. Transportation, backup, and recovery procedures are all included in the physical architecture. The requirements of the end users are a major consideration in the design. The majority of end users want to do analysis and look at data in bulk rather than as individual transactions. End customers, on the other hand, often do not know what they want until a particular need emerges. As a result, sufficient investigation should be included in the planning phase to anticipate requirements. Finally, the data warehouse should be designed to allow for growth and development in order to meet the changing requirements of end users.

Cloud-based data warehouses provide the same features and advantages as on-premises data warehouses, but with the additional benefits of cloud computing, such as flexibility, scalability, agility, security, and cost savings. Cloud data warehouses enable businesses to concentrate exclusively on extracting value from their data rather than having to develop and maintain the data warehouse's hardware and software infrastructure. Data lakes contain a large amount of unprocessed, unstructured data that may be utilized for a specific purpose later. A data lake stores raw data from line-of-business applications, mobile apps, social media, IoT devices, and other sources. The structure, integrity, selection, and format of the different datasets are determined by the individual doing the study at the moment. A data lake may be the best option for businesses that require low-cost storage for unformatted, unstructured data from many sources that they plan to utilize for some reason in the future. The architecture of a data warehouse is determined by an organization's business processes, taking into account data consolidation across the organization with security, the level of query requirement management, Meta modeling and organization, warehouse staging area planning for optimal bandwidth utilization, and full technology implementation. However, a lack of quality in the data warehouse's information may lead to poor strategic choices. As a result, data warehouse information quality must be ensured, which is dependent on presentation quality, data quality, and data model quality (both physical and logical). Multidimensional modeling is generally recognized for data warehouse data modeling, and OLAP tools directly access multidimensional schemas of data warehouses to assist decision makers. As a result, the quality of the data model has a significant impact on the overall quality of the data warehouse. Facts and dimensions are organized in multidimensional schemas. The measurements for analysis along the dimensions are included in the facts. For better data representation, dimensions include characteristics, granularity levels, and hierarchies.

All of these structural components, as well as their relationships, influence the schema's complexity, which in turn influences the data model's quality. Previously, the quality of data warehouse conceptual models was regarded intuitive, but to improve objectivity, these intuitive concepts of quality must be replaced with a set of quantitative measurements. A metric is a method to consistently and objectively assess a quality element. Several writers have suggested criteria to assess the quality of conceptual data models for data warehouses, such as maintainability, understandability, and so on. These measures have been theoretically and experimentally verified.Fig.2, illustrates the data cube multi dimensional model used in data ware houses. As a result, in this article, we provide a systematic literature analysis of data model quality measures for data warehouses in order to understand the current state of the art and identify research gaps. The rest of the paper is structured as follows: The methods used to

perform SLR for our study field are described in Section 2. This document summarizes the different criteria suggested for assessing the quality of data warehouse conceptual data models. Deliberates on the SLR's results, expanding empirical evidence, data warehouse quality variables, and current research gaps. It is the framework that manages the storage, retrieval, alteration, and deletion of data in the Data warehouse by converting information from one form to another step by step. It refers to the different resources available, such as software resources for data warehouse maintenance and management. The performance of the data warehouse system is directly related to the quality of the resource architecture.

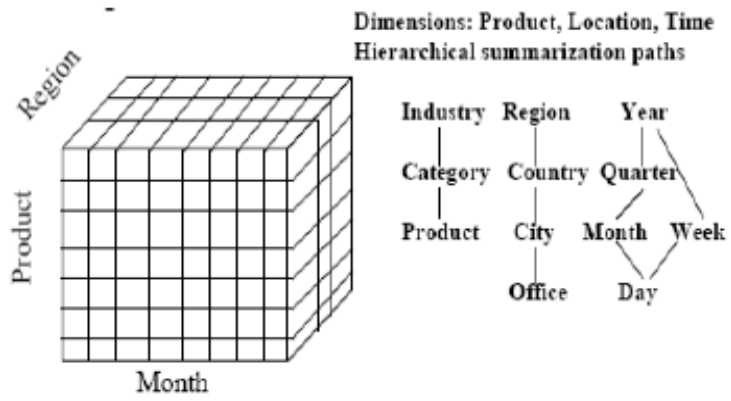

Fig. 2 : Illustrates the data cube multi dimensional model used in data ware houses.

The above categorization provides an overview of the many types of attributes that should be considered when designing a data warehouse architecture. However, when we discuss the overall design of a data warehouse, we typically refer to a multi-tiered architecture. The following diagram depicts a typical three-tier architecture. We are quite familiar with entity relationship modeling for regular operational databases, but for portraying the Data warehouse, we utilize a different method known as dimensional modeling, which employs the idea of fact and dimension. Essentially, dimensional modeling is a method for logically structuring data in a standard, understandable framework for high-performance access that consists of a fact table with a multipart key and a collection of smaller tables known as dimension tables. The fact table contains two kinds of columns: one for facts and the other for foreign keys. Numeric measurements are what facts are. The looked up reference table is also known as a dimension table. It is a table that contains information on the perspectives or entities that an organization wishes to keep track of the facts and dimensions are combined, we obtain a data cube, which is a multidimensional representation of the data.

However, unlike the geometric cube, this cube is n-dimensional and not limited to three dimensions. When compared to the traditional relational data modeling method of utilizing ER diagrams, multidimensional data modeling offers many benefits. The illustration depicts a data cube that considers sales volume as a function of product, month, and region. All publications that addressed the quality of conceptual data models in data warehouses and provided metrics for the quality characteristics that influence such data models were deemed relevant. We performed our main search to extract studies from sources of information based on our research questions, and originally 18088 papers were obtained. The papers were first weeded out based on their titles. Only 453 research remained after excluding papers relating to physical and logical data models. Around 100 articles were excluded since they only discussed the conceptual model of data warehouses and not its measurements. Then, based on their abstracts, we screened out 65 studies that were not relevant to our study. Finally, complete texts were reviewed, and based on

exclusion and inclusion criteria, a list of 22 papers was determined to be relevant for our study. After exploring internet databases, we found a total of 22 papers that were relevant to our study.

More over half of the articles in this study were published in journals, according to the distribution. The bulk of the remaining papers were thereafter published in conference proceedings, with just a few being published in workshops. The first step in creating a data warehouse is to extract and clean data. The most essential element of any database is the quality of the data in order to obtain the required result as quickly as possible. We now have a variety of tools for data extraction and cleaning, but none of them are as efficient as we would want. We obviously need quality data to obtain quality results, therefore extraction and cleaning of data to acquire quality data is a hot study topic for data warehouses. Data transformation and integration is another topic that should be investigated further since data warehouses are built utilizing data from a variety of sources, thus we should have effective solutions accessible now. Because various databases have different schemas and formats, converting them to a comparable format before loading into the data warehouse is one of the most essential jobs in data warehousing. Data transformation with the least amount of mistake and information loss is still a long way off. Another area where we have a lot of room for improvement is data warehouse maintenance. To effectively handle the growing size of the data warehouse, we should search for improved maintenance methods, as well as better software and hardware. Metadata management should also be investigated further. Any system's primary goal is to get the result as quickly as possible. We have many technologies in the data warehouse for efficient query processing, but they still need to be enhanced significantly to reach the necessary efficiency. More study on query processing is required.

CONCLUSION AND IMPLICATION

The foundation of an automated decision support system is data warehousing. Although much study has been done in the last decade, there are still many problems that need to be addressed in the future. At the moment, one of the most popular study topics is performance and management. We've compiled a list of the most recent data warehousing solutions and organized them into logical categories. The data warehouse architecture is also separated conceptually, and a representative model of the architecture is provided. We looked at some of the most important study topics, such as data cleansing, data transformation, maintenance, and query processing efficiency. We identified key data warehousing research topics and things to undertake in the future to get the most out of our data warehousing.

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A REVIEW ON MACHINE LEARNING AND IT'S ALGORITHMS

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ABSTRACT

As technologies is conquering every current sector in today's day. Machine Learning has emerged amongst one of the most challenging and most utilized technologies globally. Machine Learning is essentially training computers to do the real-time tasks without human involvement. There have been numerous innovations and advancements in deep learning which has also affected human life. Machine Learning has its implications in many sectors such as medical, business, finance, robotics, engineering or several more domains. Machine Learning algorithms of many kinds are available which are utilized in different models. These algorithms play essential part in every model or project they are utilized. All these implementations, types and methods have been covered in this article. This article provides overview of machine learning as well as its algorithms. It outlines how deep learning is anticipated to dominate every current sector. It also discusses what are all the expectations of future from machine learning in approaching time period or how it is going to develop human life.

KEYWORDS:*Algorithm, Data, Machine Learning, Model, Result.*

1. INTRODUCTION

Machine Learning is the process of training computers to do various jobs without explicitly programming them. It is the area of engineering which provides robots the capacity to learn and execute tasks without human involvement. In machine learning models training data is given to the model. The model examines and observes different aspects of the data given to it and then learns from the trained data. After that test data is given to the model in which the model needs to provide findings depending on its learning. The model generates estimates based on training data or provides output results. Then the accuracy level of model is evaluated by using different methods such as Logistic Regression, Decision tree or Random Forest Tree. On whatever method the model provides better results is chosen for real time usage after evaluating its applicability level[1]. Figure 1 shows the type of Machine Learning which are discussed in details below.

1.1.Types of Machine Learning:

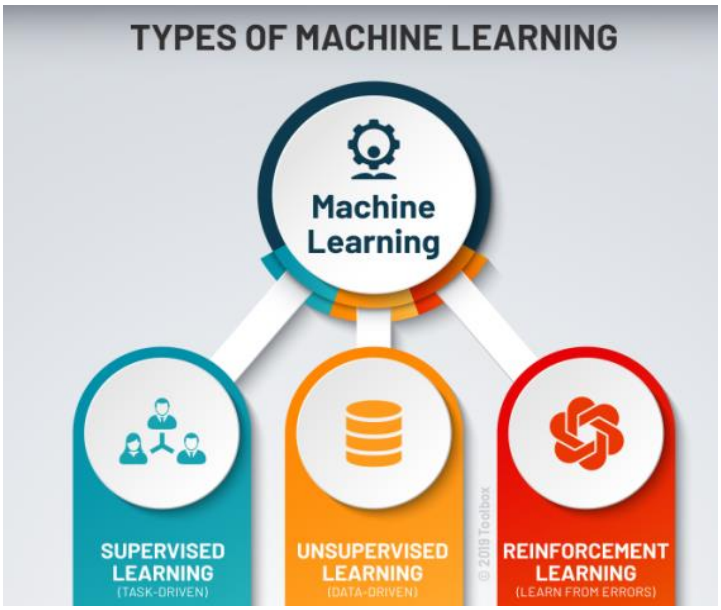

Figure 1: Illustrate the Diagram Show Types of Machine Learning[2].

1.2. Supervised Learning:

Supervised Learning is the kind of machine learning in which the model is supplied with labels and features along with the data. In supervised learning we train our model using labeled and tagged data. Labeled data is the data which contain both input and output variable in it. Based on this data the model generates predictions about future outcomes which are evaluated using different methods. For the test results to be correct the training data needs to be big enough so that model is able to identify patterns generated in the data and can respond according to that. After providing correct results in testing data the model may be further trained by comparing the projected data of model with actual results and mistakes gained can be utilized in changing the model. After that we offer fresh set to test it. When we have target/ dependent/output variable along with the provided data it is known as supervised machine learning issue. It is task focused since it concentrates on a specific job until it delivers correct results[3].

Supervised learning issues may be divided in two sections depending on the kind of output variable:

Classification: It covers issues under supervised learning when output has specified variables which implies output variable have discrete values.

Regression: It is the type of learning in which output variable is always a continuous value. Its primary aim is to anticipate the output value as near as it may be the real output value. After obtaining output values from model, these values are compared which real output results and error rate is determined.

1.3. Unsupervised Learning:

Unsupervised learning is simply the reverse of supervised learning. There is no such labeled as well as tagged data given to the model. Instead in unsupervised learning a huge quantity of data which is unorganized and indeed the tools to interpret that data are given to the model such that model itself figure out now and learn to arrange the data in patterns, categories or clusters which people can understand.

What makes the unsupervised learning more relevant is that most of the data available globally is unlabeled and untagged. Unsupervised learning is entirely dependent on the data given to it. The outcomes it provides are entirely data driven.

1.4. Reinforcement Learning:

It is totally different from supervised or unsupervised learning. In it there is no training data given to the model. In it the model needs to determine by itself what to do and how to accomplish the specified job. In it the model attempts to discover the optimum solution to the given issue. The model performs consecutive steps one by one determining by itself all the moves. In it the output entirely relies upon the condition of input and each future move is dependent on the outcome of previous step. One of the most prominent example of reinforcement learning is Chess in which each single move has varied consequences[4].

1.5. Semi-supervised Learning:

As the name indicates it contains few characteristics of the supervised learning. In semi supervised learning the model is supplied with a small quantity of labeled data and a big amount of unlabeled data as training data. The method followed in it is that initially the model will cluster the unlabeled comparable data using unstructured machine learning techniques and then it will label remainder of the data using provided labeled data. This is a type of idea as we see in schools where instructor teaches few questions as well as explains them to pupils and then provide remainder of questions to practice and answer by themselves. Figure 2 shows the various applications of Machine Learning used in several areas which are discussed below one by one in detail[5].

1.6. Applications of Machine Learning:

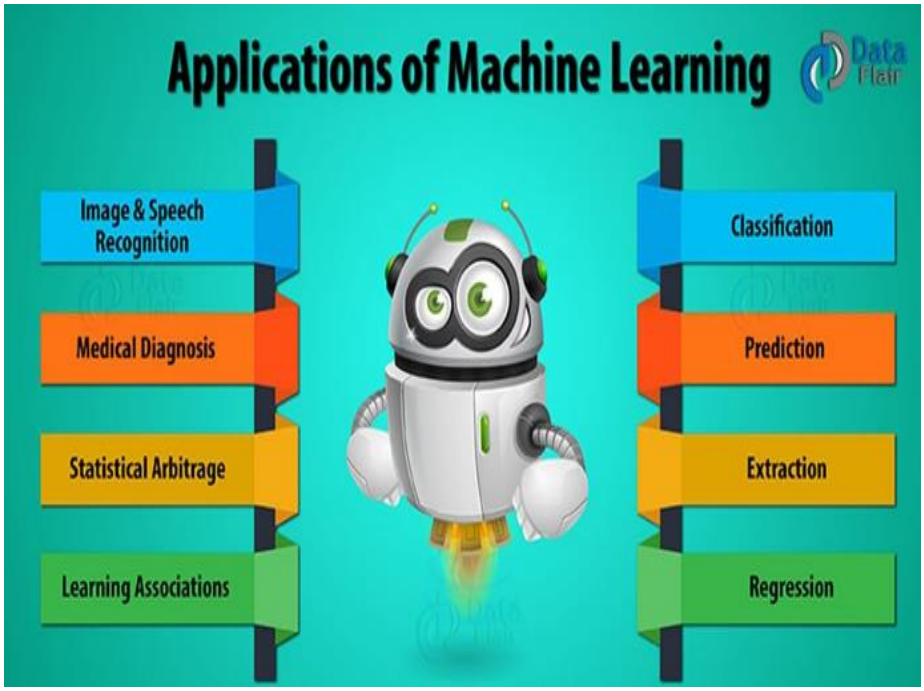

Figure 2: Illustrate the Applications of Machine Learning in various areas[2].

1.7. Image Recognition:

It is one of the most significant and frequently used applications in machine learning. Image recognition is essentially the process or method of recognizing objects, items, people, pictures, logos, buildings and locations. There are numerous phones and laptops today which utilize face detection unlock system, it is only feasible because of image recognition application of machine

learning. It is employed at in CCTV cameras to capture criminals and odd behaviors. It is utilized at numerous police stations and criminal investigation agencies. It is used in Google pictures application for grouping images of individuals. There are numerous applications in which we may simply scan the item and obtain all relevant information about it. The major stages involved in this process are collecting of data, structuring of data and then creating a model which can forecast the outcomes and utilize it for image recognition process.

1.8. Speech Recognition:

Voice Recognition is similar to Image recognition. It's only here voice of a person is recognized. It is described as the capacity of gadgets to react to spoken instructions. Nowadays there are lots of gadgets which utilize voice recognition technology. In Android phone there is Google voice assistant which operates on voice commands and makes it simple to work. There are speakers, headphones and earphones and many other gadgets which are created with in-built speech recognition technology in them. There are keyboards which are voice aided , they translate voice instructions into text messages and may be used for chatting, searching and many other tasks. The voice recognition feature makes it simple for users to automatically plan their appointments, meeting, sending mails, maintaining music playlists, playing songs, video games, buying online meals, or many other similar activities can be done on one voice command. Apple has developed its own Artificial Intelligence based chatbot called Siri which is available in all the iPhone and operates on voice requests. Similarly, Amazon offers Alexa, its own created program which operates on voice command. So essentially Speech recognition system has its use all over globe in different sectors which has made lots of jobs easier to complete and have made human life better.

1.9. Traffic Prediction:

Currently, road congestion becomes a significant issue worldwide. People have to wait for several hours trapped in traffic for getting to their job locations. In certain highly crowded cities circumstances have gotten so bad that a journey of half hour often takes 2 hours or more. Seeing these issues individuals have come up with solutions among which the most helpful and beneficial is traffic prediction system. Google maps is an application designed for assisting users discover quickest routes based on source and destination location given. It utilizes Dijkstra's method of determining the shortest path or path among two points. Google Maps estimates the road or path which has least traffic and takes least time giving the user the best way to the destination. It forecasts traffic conditions including whether road is highly crowded or sluggish traffic is present based on which user may select which route to take. It also assists in revealing real time location of a person. It assists in calculating how much it takes for getting to a specific destination from present or any source location[6]. Thus, traffic prediction system assists individuals saving their time as well as reaching the intended destination.

1.10. Autonomous Vehicles:

As the name indicates autonomous automobiles are the cars which are qualified to drive without human involvement. These vehicles contain sensors based on which they detect the environment and respond appropriately. In these autonomous vehicles there is no need of presence of people at all neither as an operator nor as a passenger. These vehicles can go anywhere without any people supervision in the same manner that a person can. The operation of these vehicles entirely relies upon the sensors, actuators, algorithms, Based On machine learning technologies present in them. They have radar sensors that are used to detect the presence of adjacent cars. These have videos cameras placed in them via which they can identify people, traffic light signals and interpret road signs. Presence of Lesser sensors makes it simple to handle lane crossings, road margins and light detection. Ultrasonic sensors located in the wheels are utilized to identify curbs

when parking the vehicle. These vehicles are currently through the testing process as well as will be out to use very soon having great effect on lives of people[7].

1.11. Online fraud detection:

There are many instances of online fraud or online money theft which makes consumers concerned and think twice before completing any online transaction. Whenever someone conducts an online transaction there are numerous methods by which the money may be taken by some third party. It includes individuals with false accounts or fake ids similar to people you know and then they take money from the user account in the midst of the transaction. To guard and prevent from these frauds Machine Learning application Feed Forward Neural network has been created which identifies which is able to identify whether a transaction is real or fraud. It has made internet transactions considerably more safe and secure[8].

1.12. Medical Diagnosis:

Similarly, to different sectors machine learning plays a crucial part in medical profession too. There are many gadgets in which machine learning (ML) algorithms are employed which aids in treatment of different illnesses. There are devices such as DeepGene which are integrated with Machine learning techniques which help in identifying the tumor at early stage so that appropriate therapy can be given to the patient. Pathology is a medical field in which ML is employed in increasing blood precision and in mapping sick cells. In dermatology ml algorithms are used to treat acnes, fungus and seborrheic dermatitis. Mental Health problems of many individuals are addressed by early identification of mental illness signs utilizing ML methods. There are many different such sectors of medical field in which machine learning methods are utilized for treatment of patients[9].

1.13. Automatic Language Translation:

It is essentially the process of translating one language into another. Each nation has its own distinct language. In reality, in nations like India there are various languages used in different states. Well clearly a single individual cannot know all the languages therefore if someone goes to some another nation or state he needs to speak in the local language of that people which cannot be done without the need for a translator's assistance. Here comes the role of Automated Language Translation method. People do not need to have a translator with them anymore as Automatic language translation converts the content into any language of user's choosing. Google has created Google Neural Machine Translation which can convert the text into a language familiar to the user, this process is known as automated translation. The technology utilized in this procedure is sequence to sequence learning algorithm[10].

1.14. Algorithms of Machine Learning:

1. Linear Regression: Regression Analysis is a supervised machine learning method. It is used to conduct regression tasks. It is used to compute numbers like as total number of people, cost of homes, etc. based on continuous variables. In this a connection is created between dependent or independent variable. It is expressed as Y= a *X + b where Y is the Dependent variable, an isthe slopes, X is the independent factor as well as b is the intercept. Figure 3 shows the linear regression graph Height of People with their body weights.

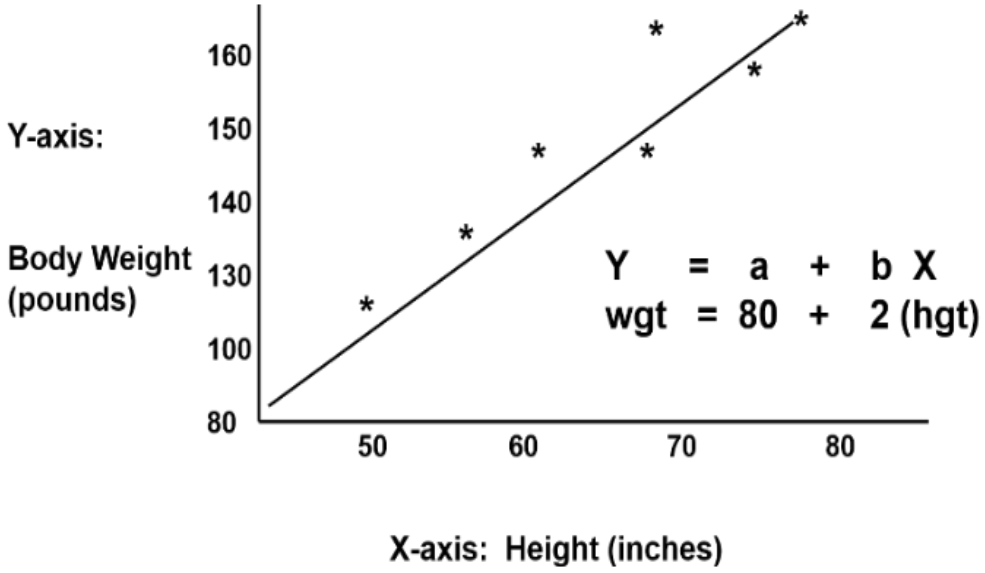

Figure 3: Regression graph Height of People with their body weights.

1.14.1. Logistic Regression:

Regression Logistic is a classification category supervised machine learning method. Its output variable only accepts separate values for a set of characteristics. It is used to utilize functions to forecast the likelihood of an occurrence. Because it forecasts probability, its output value is always between 0 and 1.

1.14.2. Decision Tree:

This is another supervised learning method that is usually used to solve classification issues but may also be used to solve regression difficulties. The data is represented using a tree structure, with each leaf node representing a class label and all interior nodes representing characteristics. At first, the whole data set is seen as a root. Feature values should ideally be categorical, but if they aren't, they are transformed to discrete values. It is utilized in a variety of fields, including business, law, engineering, and many more.

1.14.3. Machine Learning's Obstacles:

- Data gathering is a time-consuming and expensive procedure. It takes a long time, or not everyone has the time or patience to devote a significant portion of their time to such a task.
- Once the data has been collected, it must be processed utilizing a variety of data annotation techniques. This procedure is entirely responsible for the model's correctness. As a result, even a little error may derail the whole operation.
- Each technology has fresh upgrades and improvements that not everyone can comprehend and apply in current technologies.
- It takes months to develop a good model or project that necessitates patience, and today's fast-paced generation lacks the patience to finish even a single job.

2. DISCUSSION

Machine Learning has a broad range of applications all around the globe. With its discoveries and advancements, it has changed the whole technical sector. It has made inroads into a wide range of disciplines, including medicine, finance, business, physiology, psychology, and a variety of others. It has a wide range of applications, including robotics, speech recognition,

image recognition, traffic prediction, self-driving cars, automated vehicles, pathology, medical diagnosis, fully automated language translation, product recommendation, online fraud detection, email as well as spam filtering, and many more. This article goes through all of these applications as well as the methods utilized in them, such as logistic regression, decision trees, and linear regression. Machine learning technologies have proven to be a benefit in today's fast-paced environment, according to the author.

3. CONCLUSION

Machine Learning is a huge area packed with life-changing innovations that have had far-reaching effects on human lives that no one could have predicted. There are many machine learning advancements that are assisting in the saving of thousands of lives. Diagnostic machines, ultrasonic machines, X-ray machines, and other equipment that aid in the identification and treatment of different illnesses.

Machine learning has become a critical component of every business. It has made every job so much simpler and faster than it was before. Machine learning algorithms have shown to be very useful and simple to utilize in performing a variety of jobs. Because machine learning is utilized everywhere, it seems that it will continue to expand and spread in the future. It has high future aspirations;thus, ML devices will have a lot of potential in the future.

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A REVIEW OF DATA MINING TECHNIQUES FOR THE ANALYZATION OF BIG DATA

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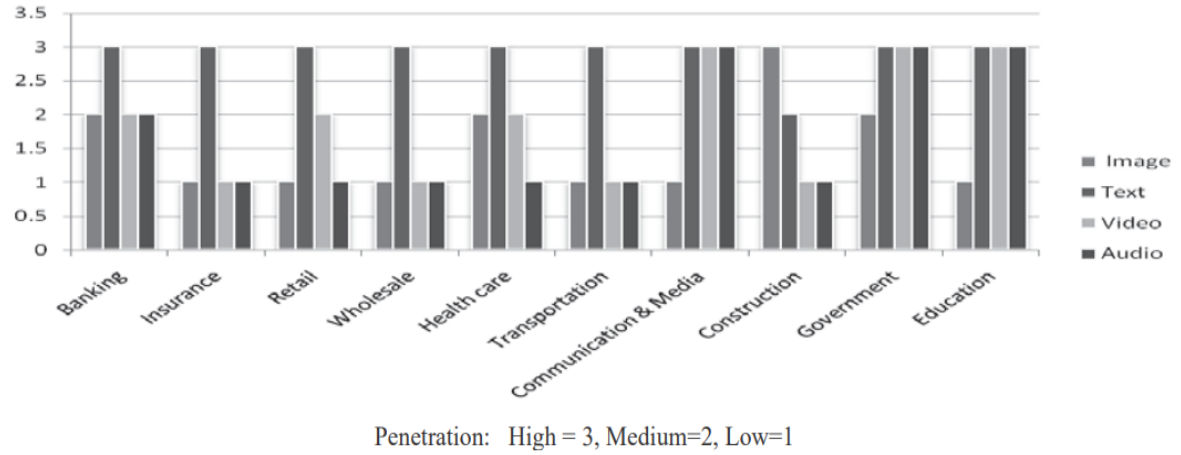
ABSTRACT

Big Data is a new idea that covers cutting-edge methods and technology for analyzing huge volumes of complicated information produced at different speeds and from diverse sources. Data mining methods are proving to be very useful in the field of Big Data Analytics (BDA), since dealing with large amounts of data poses significant difficulties for applications. The capacity to extract valuable information from massive databases is known as big data analytics. The significance, difficulties, and uses of Big Data in many areas, as well as the various methods utilized for Big Data Analysis utilizing Data Mining techniques, are discussed in this paper. The results of this study provide scholars with important information about the major trends in Big Data research and analysis utilizing various analytical domains.

KEYWORDS:*Big Data, Big Data Analytics, Big Data Application, Data Mining.*

17. INTRODUCTION

In our digital age, analysts have access to massive quantities of data. Big Data is a phrase used to describe a collection of unstructured, semi-structured, and structured information that are challenging to gather, manage, process, or analyze using traditional database software tools and technologies due to its volume, complexity, and pace of development. Text, video, picture, music, website log files, blogs, tweets, location information, sensor data, and more formats are used. Smart and scalable analytics services, programming tools, and apps are required to extract valuable information from such large datasets. The data comes in a variety of forms, including audio, video, pictures, and text, and it varies by industry. Text data is handled by the banking, insurance, and health-care industries. Audio and video data are heavily influenced by communication and media. Fig. 1 demonstrates how, based on the kinds of data produced and stored, there are differences in the quantity of data stored in various sectors.



Penetration: High = 3, Medium=2, Low=1

Fig. 1: Various sectors produce and store different kinds of data.

Data mining, also known as Knowledge Discovery in Databases (KDD), is an analytical technique used in a variety of fields to find meaningful connections between variables in big data sets. Analyzing large amounts of data in a short amount of time may lead to new insights and theoretical ideas. Big data has the potential to help businesses improve their operations and make quicker, more informed choices.

Data mining is the process of examining and analyzing large amounts of data in order to uncover patterns in big data. The methods were derived from statistics and artificial intelligence (AI), with a dash of database management tossed in for good measure. Data mining usually has one of two goals: categorization or prediction. The goal of classification is to organize data into groups. A marketer, for example, may be interested in the characteristics of individuals who reacted to a promotion vs those who did not. There are two types of classes. The goal of prediction is to forecast the value of a continuous variable. A marketer, for example, may be interested in forecasting who would react to a campaign.

18. LITRATURE REVIEW

This part includes a thorough assessment of the literature from a variety of publications, academics, and other online sources. It is split into two halves. The first section is an overview of Big Data's significance, difficulties, and applications in different areas. The second section covers the various methods to Big Data Analysis and their results using various Data Mining techniques. Wei Fan et al. provided an overview of big data mining in 2012, including its current state, debate, and future predictions [1]. Kaur et al. discussed a variety of Big Data problems [2]. They also discussed how Big Data analysis may help address certain operational, financial, and commercial issues in aviation that were previously intractable due to economic and human resource limitations.

S.Vikram et al. demonstrated the five aspects in which big data varies from ordinary data: volume, velocity, variety, value, truth, and complexity [3]. They discussed how large data systems are handled using the Hadoop framework. The authors also focused on the difficulties that businesses must confront when dealing with Big Data, such as data privacy, search analysis, and so on. D. Agarwal published a thorough research on data mining, models, issues, and applications in 2013 [4]. D. Kishor proposed changing the fundamental concept of Big Data from 3V to 3C in order to better explain Big Data analytics using mathematical and statistical methods [5]. In 2014, R Gupta et al. presented an overview of big data, its significance, big data technology, and how big data can be used to self-organizing websites, which can be extended to the area of advertising in businesses [6].

Big Data's content, scope, techniques, privacy, security, samples, benefits, and difficulties were all discussed by S. Sagiroglu et al [7]. They discovered that the difficulties were not only in collecting and managing data, but also in extracting valuable information from that data. In 2014, Xindong Wu et al. proposed the HACE theorem, which defines the characteristics of the Big Data revolution and offers a Big Data Processing model from a Data Mining perspective [8]. Healthcare, networking security, market & business, education system, communications, and other real-time uses of big data were given by the authors Sabia et al [9]. B. Thakur et al. reviewed several kinds of big data in 2014, as well as major difficulties in big data management and analytics that emerge from the nature of data, which is vast, varied, and changing [10]. In July 2015, the author Vatsal Shah examined huge amounts of unstructured data in the form of video and proposed a solution utilizing the Hadoop platform [11].

19. DISCUSSION

19.1. Big Data:

Big Data encompasses not just a huge amount of data, but also additional characteristics that set it apart from the notions of "extremely big data" and "massive data." In reality, there are many definitions of Big Data in the literature. “Big Data technologies represent a new generation of technologies and architectures intended to cheaply extract value from extremely large quantities of a broad range of data, by allowing high-velocity collection, discovery, and/or analysis,” according to the International Data Corporation (IDC). Big Data is defined by the McKinsey Report as "data sets that are too large for traditional database software tools to collect, store, manage, and analyze."

The three Vs, or Volume, Variety, and Velocity, are often used to characterize Big Data. The size of the data is represented by the volume. Velocity refers to the rate at which real-time data is generated and delivered. Because data originates from a variety of sources, as illustrated in Table 1, the data becomes too large.

TABLE 1: DIFFERENT TYPES OF BIG DATA & ITS SOURCES.

Data Types	Sources	Formats
Structured	Business Applications such as retail, finance, bioinformatics etc.	RDBMS, OLAP, Data warehousing
Semi-structured	Web Applications such as web logs, email, webpages	XML, CSV, HTML, RDF
Unstructured	Images, Audio, Video, Sensor data, Blogs, Tweets etc.	User generated text content

The following Big Data definitions offer a collection of tools for comparing Big Data to conventional data analytics. Table 2 summarizes this comparison using the 3Vs (Volume, Velocity, and Variety) dimension.

TABLE 2: COMPARISON OF BIG DATA AND TRADITIONAL DATA.

Characteristics	Big Data	Traditional Data
Volume	Terabyte, Petabyte, Exabyte	Gigabyte
Velocity	More rapidly	Per hour, day
Variety	Structured, Semi-structured or Unstructured	Structured
Data integration	Difficult	Simple
Data access	Real time or batch	Interactive
Source of data	Fully distributed	Centralized

The study of Big Data is at the heart of contemporary research and industry. Because a large quantity of data is produced from a variety of heterogeneous sources, storing, extracting, transforming, and loading it becomes challenging. According to a recent study, Google receives over 4 million search queries per minute, e-mail users send over 200 million emails, YouTube users upload 72 hours of video, Facebook users share over 2 million pieces of content, Facebook processes 350 GB of data per minute, more than 570 websites are created per minute, and Twitter users send 277,000 tweets per minute. According to estimates, the produced data constituted approximately 5 exabytes until 2003, 2.7 Zettabytes until 2012, and is projected to grow fourfold by 2016. Astronomy, social media/entertainment and networking sites, life sciences, healthcare, video surveillance, government data, sensor technologies and networks, mobile devices, and other fields all have large datasets. The Fig. 2 shows the data in Exabyte (EB) for the year 2005-15 [12]. The quantity of data was rapidly expanded throughout this time owing to the major contribution of Big Data Analytics, as seen in this graph from 2005 to 2015.

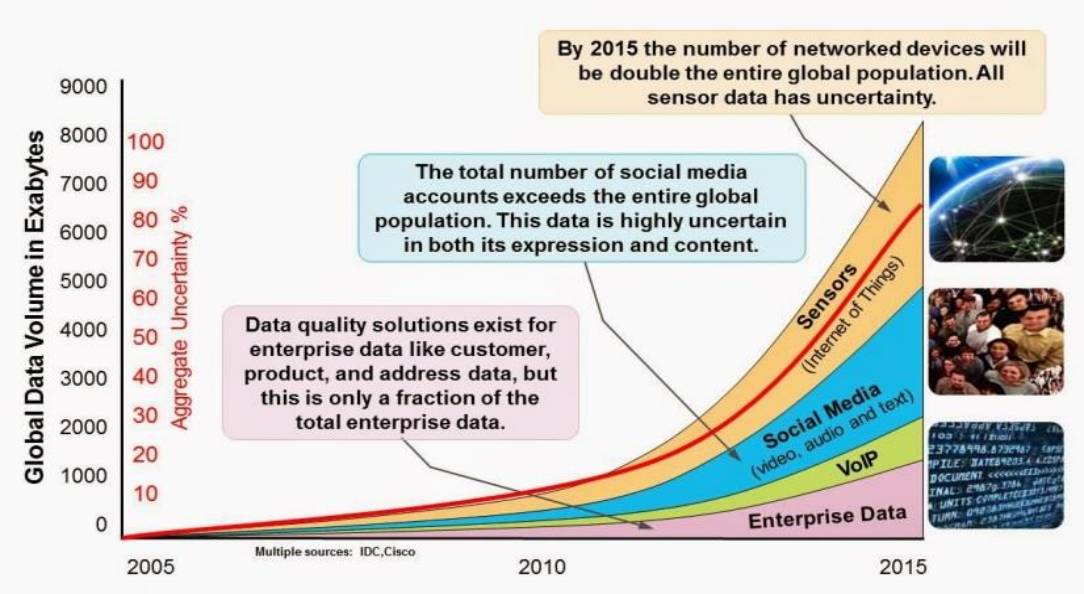


Fig. 2: Illustrates exponential data growth [12]**.**

Several difficulties that businesses or media must confront when dealing with Big Data include capturing Big Data, its length, storage, sharing, analysis, display of enormous data, and, of course, the most essential technology. For this, new architecture, algorithms, and methods for implementation are required. It also requires technological expertise. As a result, specialists are required to deal with Big Data using this new technology. Technical Challenges, Data Management and Sharing, Privacy, Security and Trust, and Misuse of Big Data are all issues that must be addressed while analyzing Big Data.

19.2. Data Mining:

Because there is a lot of data out there with a lot of hidden knowledge, data mining has become a hot topic in the information business. Indeed, we might argue that data mining is a relatively recent scientific study topic in the fields of statistics, machine learning, database management science, and visualization that aims to find and display information in a way that humans can comprehend. The goal of data mining is to extract hidden information from huge amounts of data. This information may assist and support organizations in making better and more informed choices. The potential for data mining algorithms to generate millions of patterns and rules is enormous. Knowledge is represented as an intriguing pattern. The discovery process may be guided by objective or subjective measures of pattern interestingness. There are a variety of common models that may be utilized to solve various data mining issues. Among them are Nave Bayes, Decision Trees, Neural Networks, Support Vector Machines, and K-means.

19.3. Big Data Analytics & Process Model:

Big Data Analytics is a tool that allows businesses to analyze huge amounts of data in order to find patterns and other valuable information. The quantity of data has grown rapidly over the last decade, from 2005 to 2015. This is due to the substantial contribution of Big Data Analytics. The following are examples of technical advancements in Big Data storage, processing, and analysis:

- In recent years, the cost of storage and CPU power has dropped dramatically.
- The creation of new frameworks, such as Hadoop, that enable users to take use of distributed computing systems capable of storing huge amounts of data and processing it in a flexible parallel manner.
- Datacenters and cloud computing's flexibility and cost-effectiveness for elastic processing and storage.

The Process model for Big Data analytics is the focus of this section. The entire model is split down into two sub-processes: data management and analytics, which are further separated into five phases as shown in Table 3.

TABLE 3: PROCESSES FOR EXTRACTING INFORMATION FROM BIG DATA.

Big Data Processes	
Data Management	**Analytics**
1. Acquisition & Recording 2. Extraction, Cleaning & Annotation 3. Integration, Aggregation & Representation	4. Modeling & Analysis 5. Interpretation

TABLE 4: TAXONOMY OF BIG DATA ANALYTICS.

Analysis Domain	Characteristics	Approaches	Techniques	Source of Data
Structured Data Analytics	Structured records, less volume and real time.	Statistical Analysis	Statistical Machine Learning. RDBMS, OLAP, Data Warehouse	Business & Scientific Data.
Text Analytics	Language dependent, Unstructured, Semantic, Rich Textual.	Text Mining, Opinion mining or Sentiment Analysis, Summarization, Question Answering System, Natural Language Processing (NLP).	Clustering, Neural Network, SVM, Decision Tree, Naïve Bayes	Emails, logs, Blogs, Twitter, Facebook, Webpage, Corporate documents, Government Rules and Regulations etc.
Web Analytics	Integration of Text and Hyperlink, Symbolic, Metadata	Web Content Mining, Web Usage Mining, Web Structure Mining	Classification and Clustering.	Various Web Pages
Multimedia Analytics	Collection of Audio, video & image	Indexing & Retrieval, Summarization, Error detection, annotation	Multimedia annotation, Video Summarization, audio Summarization	User generated multimedia, surveillance, healthcare media, corporation produced multimedia.
Mobile Analytics	Fragmented data, person specific	Monitoring	Location based mining	Mobile phone applications, sensors

The most crucial step of the Big Data Process model is data analysis. This model's aim is to derive valuable insights and conclusions that will aid in decision-making. The goal of data analytics is to collect as much information as possible that is relevant to the topic at hand. The researcher discovered that the produced data is separated into different areas of Big Data applications in Big Data Analytics. Structured Data Analytics, Text Analytics, Web Analytics, Multimedia Analytics, and Mobile Analytics are a few of them. Table 4 highlights all five kinds of Big Data applications, which are grouped by data type and include data features, various methods and techniques, and data sources. Data analytics deals with information about a phenomena acquired via observation, measurement, or experimentation.

20. CONCLUSION

In the past decade, the exponential increase in data capacity and complexity has prompted much study in the area of big data technology. We have attempted to synthesize the current literature review year by year in the field of Big Data and its analysis using various analytics methods in this article. Text analytics, which is regarded as the next generation of Big Data, is now widely acknowledged as a mainstream method of extracting valuable information from millions of opinions posted on social media. Because of the strong interest in real-time data of rich picture and video material, video, audio, and image analytics techniques have scaled with advancements in machine vision, multilingual voice recognition, and rules-based decision engines. They are possible answers to a variety of economic, political, and social problems. Our future work will mainly concentrate on the Big Data analytics method mentioned above, which will be implemented utilizing different data mining approaches.

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USING ELECTROCHEMICAL SEPARATION AND DEGRADATION METHODS, WATER CONTAMINATION CAUSED BY PHARMACEUTICAL RESIDUES MAY BE REMEDIED

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ABSTRACT

Due to substantial improvements in electrode materials and connection with low-cost renewable energy sources, cleansing and disinfection of waterways using direct or integrated electrochemical processes has become a highly attractive option in recent years. Many electrochemical methods are now available for the treatment of waterways polluted with refractory organic pollutants, such as pharmaceutical micropollutants, which have become a significant environmental problem. Recent studies have looked at how other key techniques, such as ozonation and sophisticated oxidation processes, may help remove pharmaceutical residues. The electrochemical techniques developed for the treatment of pharmaceutical residues from both synthetic solutions and actual pharmaceutical wastewaters are discussed here. The first step is to introduce electrochemical separation technologies such as membrane technologies, electrocoagulation, and internal micro-electrolysis, which exclusively separate contaminants from water. Anodic oxidation, electro-oxidation with active chlorine, electro-Fenton, photoelectro-Fenton, and photoelectrocatalysis, among other methods, are explored further. The potential solar photoelectro-Fenton method invented and further developed in our laboratory is emphasized and described in particular. The comparison of various techniques and materials allows for the decrease of total organic carbon or the reduction of chemical oxygen demand from polluted waters. The breakdown pathways for certain medicines are also discussed.

KEYWORDS:*Electrochemical Technologies, Electro-Oxidation, Electro-Fenton, Pharmaceuticals, Solar-Assisted Processes, Water Treatment.*

1. INTRODUCTION

Pharmaceuticals have gotten a lot of attention in the past 15 years as possible bioactive substances in the environment. They are classified as emerging contaminants in waterbodies because they are still uncontrolled or are in the process of becoming regulated, despite the lack of directives and legal frameworks. These chemicals, as well as their bioactive metabolites, are continually delivered into the aquatic environment, where they are identified at trace quantities

and become pseudo-persistent. In reality, it seems that the majority of urban wastewater contains therapeutic chemicals. This has an impact on water quality and drinking water sources, as well as posing a long-term danger to ecosystems and human and animal welfare [1] .

Several reviews have documented the presence and destiny of medicines in the environment, where they are ubiquitous in soil and water. Emissions from manufacturing facilities, direct disposal of overstock medicines in homes and hospitals, excretion from urine or feces following drug delivery to people and animals, and water treatment in fish farms all contribute to this pollution [2].

Veterinary medicines, for example, pollute soil directly via manure, as well as surface and ground waters through field runoff. Pharmaceuticals persist in the environment mostly due to inadequate sewage treatment plant (STP) removal, with between 60% and 90% of them persisting after biodegradation, deconjugation, sorption, and photodegradation processes. The biorecalcitrantunmetabolized and metabolized pharmaceutical residues in the STP effluents are subsequently discharged into the receiving surface waters, mostly rivers. Pharmaceuticals discharged into the environment have the potential to cause toxicity at any level of the biological hierarchy, but their impacts on living things are still unknown. For example, it is well recognized that certain medicines, even at low concentrations, may induce long-term, irreversible changes in the genome of microorganisms, increasing their resistance to them. Furthermore, these pollutants are often found in complicated combinations, resulting in "drug cocktails" whose toxicity is difficult to anticipate, such as beta-blockers. Some medicines, on the other hand, have been labeled as endocrine disrupting chemicals (EDCs) because they damage the human endocrine system [2].

The aforementioned factors highlight the necessity for medicines and their metabolites to be completely removed from aquatic systems to prevent potential toxicity and other harmful health consequences. Traditional methods such as bioremediation and physicochemical treatments such as coagulation, volatilization, adsorption, sedimentation, and filtration cannot completely eliminate these contaminants in STPs [3].

Chlorination and/or UV irradiation are used in most STPs to disinfect final effluents; however both methods have poor oxidation capacity, and trace organic contaminants are resistant to their action. The use of ozonation and advanced oxidation processes (AOPs), which are extensively utilized for disinfecting reclaimed water, for treating pharmaceutical residues, and for cleaning pharmaceutical wastewaters, has been the focus of recent study. AOPs are ecologically friendly chemical, photochemical, or electrochemical techniques that use the hydroxyl radical (•OH) as the primary oxidant and are produced in situ [4].

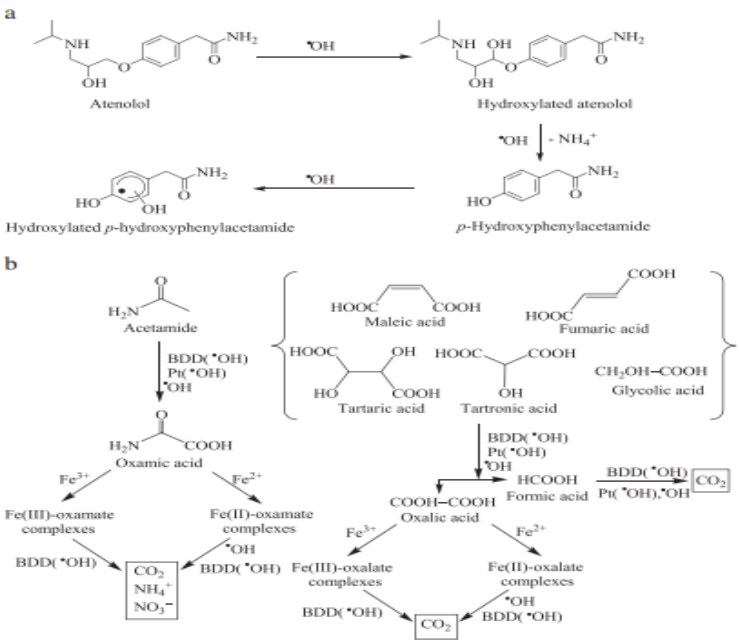

Figure. 1. (A) Initial reaction sequence proposed for the EF degradation of atenolol using an undivided Pt/carbon felt cell. . (b) Reaction path for the mineralization of carboxylic acids formed during the same treatment using combined Pt/GDE-Pt/carbon felt and BDD/GDE-Pt/carbon felt cells

2. DISCUSSION

The efficacy of ionizing irradiation in degrading medicines and personal care items is influenced by solution pH, dose rate, and water matrices, according to a recent study. In comparison to UV-based AOPs, gamma irradiation has demonstrated greater penetration and, as a result, enhanced production of hydroxyl radicals and hydrated electrons to aid in pharmaceutical breakdown. Although increasing the dosage of single gamma irradiation enhanced carbamazepine breakdown, adding peroxymonosulfate caused it to completely degrade, owing to the existence of hydroxyl radicals, per hydroxyl radicals, and superoxide radical anions.

Another carbamazepine research looked at the effectiveness of combining electron beam irradiation with hydrogen peroxide in the absence of H2O2; the scientists discovered that an electron beam irradiation dosage of 1 kGy may result in carbamazepine breakdown of up to 90%. The degradation rate increased to 95% in the presence of 10 mM H2O2. The degradation rate decreased when the H2O2 concentration was increased to 50 and 200 mM, suggesting that an adequate H2O2 concentration is required examined the efficacy of electron beam radiation on carbamazepine degradation in the presence of various ions and water matrices [5].

Due to the presence of dissolved organic matter and ions, carbamazepine degradation in river water was slower than in clean water, both in the presence and absence of suspended particles, when the adsorption dosage was adjusted from 0 to 5 kGy.

Used electron beam irradiation to study the degradation of fluoxetine and discovered that a modest irradiation dosage of 0.5 kGy was enough to accomplish almost 90% elimination, despite partial mineralization (12.5 percent) at a comparable dose. The acute toxicity of Daphnia similes was related to residual levels of the parent chemical fluoxetine, rather than any by-products. Antibiotic resistance control in a wastewater treatment facility has been effective utilizing electron beam treatment (using a linear electron accelerator) [6].

Radiation has been described as a clean process since no extra chemicals are required to start the reaction, the energy cost is low, and the process may be carried out at different temperatures Aside from the degradation kinetics resulting from radiation-induced degradations, investigations should concentrate on radiolysis degradation products, mineralization, and toxicity, which have been mostly overlooked in the preceding research. In addition, at ecologically relevant concentrations, possible ionizing irradiations such as electron-beam radiation and gamma radiation should be studied.

The synergistic effect and the higher quantity of reactive species, which also causes greater mineralization, are responsible for the enhanced elimination of pharmaceuticals in hybrid systems compared to single AOP. APIs in actual or synthetic wastewaters are either treated sequentially or concurrently to optimize degradation efficiency [7] .

Combinations of AOPs, AOP selections, and treatment orders differ from research to study, and there is no clear consensus on this point. Although significant TOC removal was found (60 percent for synthetic secondary effluent and 80 percent for distilled water) as compared to the single treatment, the research failed to support the treatment order, and it was suggested that both methods be investigated concurrently. Adityosulindro and colleagues used a combination of ultrasonic and Fenton to eliminate and improve TOC levels of ibuprofen in distilled water and municipal wastewater from a treatment facility. Sonolysis in combination with ozonation and photolysis has also been investigated. Although the removal % was improved, the applied ozone flow rate had a significant impact on the removal efficiency for both single APIs and combinations. Because of increased ozone mass transfer, combining ozonation with ultrasound improved API breakdown, although it was dependent on the hydrophobicity of the molecule [8].

By evaluating TOC levels, researchers examined the potential of sonolysis and photolysis Sono-photolysis removed 91 percent of TOC, compared to just 3 percent and 8 percent for sonolysis alone and photolysis (UV) alone, respectively. The need to enhance mineralization levels, which is difficult to accomplish with sonolysis alone, drives the demand for combining sonolysis with other AOPs Complete mineralization of amoxicillin and diclofenac was also enhanced by combining ozonation with TiO2 photocatalysis result for the breakdown of medicinal combinations using a combination of. In addition, as compared to ozonation alone, and offered improved TOC removal.

More study is being focused towards this field of research since the majority of hybrid and integrated methods outperform solo therapies .Although it is clear that different AOPs are effective in eliminating medicines, the majority of AOPs are considered to be costly. To address this shortcoming, combining advanced oxidation treatment with current conventional water treatment techniques has been proposed as a more cost-effective and efficient solution Coupling AOPs has been proven to enhance effluent quality prior to release into the environment, as shown by a recent research that showed “safer” effluent when ozone and sonolysis were combined for amoxicillin degradation in water [9] .

The sequence of the linked treatment was not stated or explained in the experimental part of the majority of the hybrid studies described above. Future research should give rationale for the use of various treatment combinations in the treatment of pharmaceutical wastewater. Although linked AOPs offer greater mineralization, research should be conducted to back up this claim by identifying intermediates to ensure that the coupled AOPeffluent has little or no environmental impact compared to solo AOPs [10].

3. CONCLUSION:

The treatment of pharmaceutical residues using a variety of AOPs is gaining popularity as a result of their effectiveness and/or efficiency. The most widely used electrochemical procedures

for the treatment of synthetic aqueous solutions containing pharmaceutical residues have been EAOPs, particularly those based on the electro generated Fenton's reagent, such as the EF, PEF, and SPEF processes. The Fenton's reaction between catholically electro generated H2O2 and added iron catalyst generates •OH in the bulk, giving these techniques a strong oxidation ability. The •OH radical allows for extremely rapid aromatic ring breakage as well as the gradual oxidation of certain aliphatic carboxylic acid by-products. However, summarizes the main benefits and disadvantages of electrochemical separation and degradation methods. Advantages of Technology Drawbacks Membrane-based methods Large-scale volume treatment Membrane prices are very high.

Removal of huge amounts of organic debris and salts cleaning and maintenance issues are a common occurrence (membrane fouling) moderately fast only pollution separation is possible. Work in batch mode most of the time. Electrocoagulation Large volumes and heavy organic loading need special treatment. Electrode deterioration necessitates replacement. Removal of a significant proportion of colloidal and ionic materials Sludge production is a process that involves the production of sludge. Particles are electroplated by H2 bubbles. Only pollution separation is possible. Electrodes are inexpensive. It's possible to run in a nonstop mode. Moderately fast Micro-electrolysis on the inside Large-scale volume treatment Iron and carbon granules in large amounts are needed. Removal of large amounts of colloidal and ionic materials Sludge production is a process that involves the production of sludge. Electrodes are not required (no electrical cost) Removal is rather sluggish.

It's possible to run in a nonstop mode. Only pollution separation is possible. Oxidation via electrochemistry Large-scale volume treatment (need of large anodes or cell stacks) Fouling of the electrodes Degradation of organic materials accounts for a significant proportion of the total. Anodes with a high O2-overpotential cost a lot of money. There are no pH limitations. Keep an eye out for halogenated by-products. Work in batch mode most of the time. Processes based on Fenton Large-scale volume treatment (need of large electrodes or cell stacks) pH control (pH around 3.0) and neutralization is required. After treatment (sludge production), organic matter degrades quickly and in high percentages (more remarkable under sunlight irradiation) Keep an eye out for halogenated by-products.

H2O2 cathodic generation Work in batch mode most of the time. Photoelectrocatalysis a little amount of bias potential is needed. UV light use has a high expense. Degradation of organic materials is slow yet significant. Photoactive reactor in a certain setupPhotocatalyst that has been immobilized (no need for separating anodes or quartz glass filtering after treatment) Keep an eye out for halogenated by-products. Work in batch mode most of the time. Plasma that isn't heated large quantities of reactive oxygen species (ROS) is produced. Electricity is expensive. High productivity (low heat losses) Small-volume processing Keep an eye out for halogenated by-products.

Work in batch mode most of the time. Environment International 40 •OH, certain refractory carboxylic acids need UV radiation from commercial lamps or sunshine, as well as high oxidation power anodes. Electrochemical oxidation using "non active" anodes such as BDD and electrocoagulation, on the other hand, has been used to treat actual hospital and pharmaceutical wastewaters. Because these wastewaters often include Cl ion, the electro-oxidation process generally involves active chlorine species, making the use of "active" anodes like Ti/RuO2 intriguing. For the treatment of these contaminants, electrochemical separation methods and PEC have been less well documented, and additional study is needed to get a complete knowledge.

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THE CONCEPT OF OTHER COMPREHENSIVE INCOME, ITS ESSENCE AND COMPOSITION, REFLECTION IN THE FINANCIAL STATEMENTS

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ABSTRACT

The implementation of international financial reporting standards (IFRS) in our country is one of the important issues on the agenda. One of the most important tasks of the country today is the application of international practice in the accounting system for the recognition of income and expenses, which are the main indicators of financial accounting. This article describes and discloses the concept of accounting for the concept of other comprehensive income, its essence and composition, reflection in the financial statements in accordance with international standards, the importance in the accounting system. Studying and improving the methodological side of this process today also remains one of the most important issues. This article also discusses income that is included in the income statements, such as the definition, composition, recognition, measurement and composition of the financial statements of other comprehensive income by type.

KEYWORDS:*Income, Income, Other Comprehensive Income, Expense, Reserve, Reclassification, Adjustment, International Financial Reporting Standards, Royalties, Dividends, Rent, Interest, Profit From Financial Activities.*

INTRODUCTION

In the new Uzbekistan, intensive work is underway to reform accounting. An important regulatory document in this regard is the Resolution of the President of the Republic of Uzbekistan dated February 24, 2020 RP-4611 "On additional measures for the transition to international financial reporting standards" [1]. International Financial Reporting Standards (IFRS) is a set of documents developed by international professional organizations. Their study and implementation requires a deep analysis of each standard and the development of guidelines for their application.

Therefore, the organization of settlements in accordance with the requirements of this standard, the presentation of transparent information on income and profit in financial statements, to international investors by means understandable to them, that is, the most proven and effective

methods and technologies, recognition and assessment criteria, the introduction of a methodology for providing reliable, consistent and Comparable financial information on the company's earnings, profits, distribution and profit share using international rules and principles is an urgent task for all countries, especially those that apply IFRS for the first time.

In our country, certain results have been achieved in harmonizing the accounting of income and profit with IFRS. In particular, in accordance with NAS No. 2 “Income from operating activities” and the Regulation “On the structure of expenses and the procedure for determining financial results”, a procedure for obtaining income and financial results has been developed in accordance with international standards, since 2021, on a voluntary basis, procedures have been introduced for the preparation, international audit and publication of financial statements in accordance with IFRS for joint-stock companies, banks, insurance companies, state-owned enterprises and other enterprises.However, these achievements do not mean that the country has made a decision on a full transition to IFRS. At the same time, it should be noted that based on the strategic objectives, there are a number of issues that need to be addressed in order to improve the accounting of income and profits in accordance with the requirements of international investors. These include the recognition and widespread implementation of IFRS on income, abandoning old methods and techniques, using modern conditions for generating income, developing, measuring and reporting income, using the most advanced recognition methods, recognizing distributed profits among foreign investors and improving accounting methodology. content and structure of the statement of financial results, recognition and reflection of other comprehensive income, improvement of the content of the accounts of income and profit accounting, harmonization of the formation of final financial results and accounting in accordance with international standards, achieving transparency and comparability of the report, transformation, transformation and consolidation issues and drawing up reports. To ensure the effective implementation of these tasks, scientific research is needed to radically improve the methodology for recording income and profits and reporting financial results in accordance with the requirements of international standards for foreign investors and other information users.

The transition to international standards requires the division of income into two categories: 1. Income reflected in the income statement; 2. Other income received that is not reflected in the income statement.

In the paragraphs above, we have discussed the issues of recognition, measurement and accounting of income, which are mainly reflected in the income statement. In this section, we explore the definition, composition, recognition, measurement and presentation of other comprehensive income that is not recognized in the income statement.

S.N. Tashnazarov calls other consolidated income other comprehensive income, defining it as follows: “Other comprehensive income includes items of income and expense (including reclassification adjustments) that are not recognized in profit or loss, they are required and allowed in other IFRSs”[1].

In the ASSA graduate book in finance and business administration “Other gross income - including income and expenses that are not recognized in profit or loss (that is, they are recognized in reserves and not in profit or loss for the period)”.[2]

Irina Zavalishina notes that other comprehensive income is reflected in the statement of changes in equity: “Other comprehensive income (OCI) are items of income and expense that were not previously recognized in the income statement, but are impartially reflected in the statement of changes in equity"[3].

Elena Vakaryuk, professor at ASSA, said: "Changes related to other non-core activities of the company, which arise as a result of different revaluation of certain items in accordance with the requirements of various IFRSs, are reflected in other general income"[4].

Emphasizes the importance of the approach to recognizing other generalized income in sources. The main criterion: "There are several points of view, the most common of which is that all other unrealized income includes all unrealized income and expenses, that is, income that is not ready to cash flow at any time during the company's activities. For example, a revaluation of a manufacturing building (that is, an item of property, plant and equipment) is unlikely to occur in the next period that is expected in the course of the company's operations. The revaluation of such instruments represents unrealized gains that are recognized in other comprehensive income. On the other hand, the change in the fair value of a leased building (classified as investment property) represents realized income which is recognized in the income statement. Why?, Because, this is due to the fact that investment property can be sold at any time, depending on its accuracy, when the company decides that the investment objectives have been achieved and the building can be sold. investment property is likely to become cash flow for the foreseeable future"[5].

The definitions given in the above regulatory documents, as well as by scientists, have basically the same meaning and disclose the characteristics of other generalized income. Summarizing these definitions, we define other generalized income as follows: "**Other comprehensive income** is a part of an enterprise's comprehensive income, including items of income and expense, unrealized income that is not reflected in profit or loss is reflected in the statement of changes in equity, and their composition and accounting is provided and allowed in a separate IFRS".

A number of other characteristics of generalized income follow from this definition. **First,** there are income and expenses. However, it is not taken into account when calculating profit and loss, including net profit. Other comprehensive income is an integral part of the company's total comprehensive income. It can also be expressed by the following formula:

$$\text{Total comprehensive income} == \text{Profit and loss} + \text{Other comprehensive income} (\mathbf{1.1})$$

IFRS does not draw a dividing line between the components of this comprehensive income. There is one rule in the standards. All income and expenses are recognized only in profit or loss, except for items specified in separate IFRS. The items that are defined on a case-by-case basis in these separate standards are referred to as other comprehensive income. In our practice, the concept of other comprehensive income has not been applied. Today, for our country, which is moving to international standards, it is important to define, recognize and reflect in the structure other aggregate incomes.

Second, items included in other comprehensive income represent unrealized income. For example, as in the example above, income from revaluation of property, plant and equipment is unrealized income. Revaluation of fixed assets increases their value, but does not yet imply sale. The company has no information or plans as to when it will sell these assets in the future.

Third, gains and losses are recognized in the statement of changes in equity under retained earnings, while other comprehensive gains are recorded in the accounts that record these gains in the statement of changes in equity or are included in other items of general income. in the manner prescribed by the accounting policy. Consequently, other total income is an element of private capital.

Fourth, other income information is extremely useful information for managers and other decision makers. Consequently, international standards require users of the information to provide detailed and reliable information about other comprehensive income.

Fifth, until now, in our practice, the concept of other aggregate income has not been used. In 2021, companies that are moving to international standards will definitely have to reflect in their reports. Given the importance of these indicators for enterprises operating on the basis of our national standards, we consider it appropriate to amend our national standards accordingly.

Now let's talk about the components of other comprehensive income. All of the above sources list the components listed in IFRS. Their constituent parts, the name of IFRS and their content are shown in Table 3.1 below.

TABLE 3.1COMPONENTS OF OTHER COMPREHENSIVE INCOME IN ACCORDANCE WITH IFRS

s/n	Other types of comprehensive income	IFRS	Content
1	Change in value growth from revaluation	IAS №16 “Fixed Assets” and IAS №38 “Intangible Assets”	The increase in the value from the revaluation of "Fixed assets" and "Intangible assets" is carried out under the item "Revaluation reserve" of private equity.
2	Actuarial gains and losses on retirement benefit plans recognized in accordance with IAS №19 “Employee Incentives”;	IAS №19 “Employee Incentives”	Actuarial gains and losses are changes in the present value of fixed liabilities that result from: (a) adjustments based on experience (the results of differences between initial actuarial estimates for future events and actual events); (b) changes in actuarial tolerances
3	Profits and losses from the financial statements of the foreign division;	IAS №21 "The Effects of Currency Exchange Rate Fluctuations"	If exchange differences arise in the consolidated financial statements of the reporting entity in accordance with paragraph 31 of the standard, they are recognized in other consolidated income and accumulated as a separate component of equity until the foreign operation leaves.
4	Gains and losses on the revaluation of financial assets available for sale	IAS №39 “Financial Instruments: Recognition and Measurement”	Gains and losses on financial assets (equity instruments) at fair value through other comprehensive income. If an entity invests in securities to generate long-term dividend income and does not sell them when the market price rises, gains from changes in the fair value of financial assets are recognized in other comprehensive income.
5	Effective money planning results	IAS №39 “Financial Instruments: Recognition and Measurement”	Planning efficiency is the extent to which a change in the fair value or cash flows of a planning item associated with the planning risk is offset by a change in the fair value or cash flows of the planning instrument.

Other aggregates fall into two categories in the income classification. The first category is items that cannot be reclassified in the income statement. Other comprehensive income in this category will be reclassified to profit or loss when certain comprehensive income arises under certain conditions. The second category is items that can be reclassified in the income statement. Other items of income earned in this category are not reclassified to profit or loss under any circumstances. They accumulate as an element of private capital. In this regard, the structure of

other comprehensive income in the "Statement of Profit and Loss and Other Comprehensive Income" format, proposed in the materials prepared by the PwC Academy in 2020, is as follows (Table 3.2):

TABLE 3.2FORMAT OF THE CONSOLIDATED STATEMENT OF PROFIT OR LOSS AND OTHER COMPREHENSIVE INCOME OF ABC FOR THE YEAR ENDED DECEMBER 31, 2013 (ONLY OTHER PART OF COMPREHENSIVE INCOME)[6]

	2013	**2012**
Other comprehensive income: **Components that cannot be reclassified in the income statement.**		
Revaluation of fixed assets	**X**	**X**
Gains (losses) on investments in equity instruments carried at fair value through other comprehensive income at the option of the Company	**X**	**X**
Actuarial gains (losses) for defined benefit plans	**X**	**X**
The contribution of like-minded people to the increase in the value of the property	**X**	**X**
Changes in the fair value of financial liabilities associated with their credit risks	**X**	**X**
Income tax applicable to components that cannot be reclassified	**(X)**	**(X)**
Components that can be reclassified in the income statement		
Gains (losses) on financial assets (equity instruments) measured at fair value through other comprehensive income	**X/(X)**	**X/(X)**
Exchange rate differences when translating foreign subsidiaries	**X**	**X**
Effective money planning results	**X**	**X**
Income tax applied to the reclassified components	**X**	**X**
Total other comprehensive income after tax	**X**	**X**

This format is a proposed format that companies can develop in their accounting policies in accordance with IAS formats.

In our opinion, it is advisable to open accounts designed to reflect other total income in the current chart of accounts. This is due to the fact that, in accordance with the requirements of international standards, any result that is reflected in the increase in the assets of private equity holders, in addition to adding additional private capital, is income. Based on this view, other comprehensive income should first accumulate in accounts opened for other types of comprehensive income. At the end of the reporting period, these income accounts will need to be transferred to the corresponding private equity accounts. Since these are accounts after the final financial results, it is recommended to open account 10000 "Other income received":

TABLE 3.3WORKING ACCOUNTS, WHICH ARE PROPOSED TO BE INCLUDED IN THE CHART OF ACCOUNTS OF FINANCIAL AND ECONOMIC ACTIVITIES OF BUSINESS ENTITIES[7]

Account number	**Account name**
10010	Income from revaluation of property, plant and equipment and intangible assets (not a reclassified component)
10020	Gains and losses from the revaluation of financial assets
10021	Profit (loss) on financial assets (equity instruments) carried at fair value (reclassified component)
10022	Gains (losses) on investments in equity instruments carried at fair value (not a reclassified component)
10030	Actuarial gains (losses) for defined benefit plans (unclassified component)

10040	Contribution of the parent company to the increase in the value of the assets of the associates (non-reclassified component).
10050	Change in fair value of financial liabilities (non-reclassified component).
10060	Exchange differences arising on the translation of foreign subsidiaries (component that can be reclassified)
10070	Effective cash planning results (reclassified component)
10080	Income tax applicable to other comprehensive income
10081	Income tax applied to the reclassified components
10082	Income tax applicable to components that cannot be reclassified

Let us consider the application of these accounts and the methodological procedure for accounting for other generalized income on practical examples.

Example 1. The net profit of "Jambay Grain Products" JSC for the reporting year ended 2020 amounted to 238 785 141 thousand UZS, the cost of goods sold (goods, works, services) 200 606 212 thousand UZS, other (not related to ordinary activities) income 2 097 633 soums, operating (commercial) expenses 28 455 639 thousand soums, administrative expenses 844 746 thousand soums, non-operating expenses 12 450 thousand soums, interest income 14 037 thousand soums, profit (loss) from the disposal of financial assets at amortized cost 4 255 thousand soums, gain / loss from reclassification of financial assets from amortized cost through profit or loss to fair value for 2,400 thousand soums, impairment loss - 1,500,000 soums, impairment loss - 1,500 thousand soums, finance costs - 1,885,677,000 soums.

The authorized capital of the company is 248,420,000 soums, retained earnings - 150,448,500,000 soums. Reserve capital 58,425,123,000 soums.

In the reporting year, the following transactions took place on other gross profit: increase in the value from revaluation of fixed assets - 28,400 thousand, profit (loss) from financial assets measured at fair value at the company's option through other comprehensive income - 5,800,000 soums, fixed actuarial gain (losses) on pension plans with benefits (non-reclassified component) - 0, effective funds planning results - 0, contribution to the increase in the property value of associates - 0, exchange rate difference from translation of foreign subsidiaries - 0.

Based on the following information, it is required: 1. Preparation of a part of the income statement on total comprehensive income (profit and loss and other comprehensive income) for the reporting year ended December 31 of JSC. 2. To reflect other comprehensive income in accounting. 3. Prepare the second part of the statement of total comprehensive income; 4. Prepare a statement of changes in equity; 5. Prepare a section on private equity in the statement of financial position.

1. Based on the above data, we form the Profit and Loss section of the statement of total gross income (Table 3.4):

TABLE 3.4PART OF THE PROFIT AND LOSS IN THE STATEMENT OF "JAMBAY GRAIN" JSC ON COMPREHENSIVE GROSS INCOME FOR THE REPORTING YEAR ENDED DECEMBER 31, 2020[8]

Indicators	**Line code**	**Sum**
Profit and loss (thousand UZS):		
Revenue	010	238 785 141
Cost of sales	020	200 606 212
Gross profit (010-020)	030	**38 178 929**
Other income	040	2 097 633
Other expenses	050	12 450
Operating (trading) expenses	060	28 455 639

Administrative expenses	070	844 746
Operating profit (3+4-5-6-7) (030+040-050-060-070)	**080**	**10 963 727**
Interest income	090	14 037
Gain (loss) on disposal of financial assets at amortized cost	100	4 255
Gains / losses arising from the reclassification of financial assets at fair value at cost rather than amortized cost through profit or loss	110	2 400
Impairment loss	120	1 500
Finance costs	130	1 885 677
Profit and loss before tax (080+090+100+110-120-130)	**140**	**9 092 987**
Income tax	150	1 459 600
Profit from current activities (140-150)	**160**	**7 633 387**
Loss from discontinued operations for the year	170	-
Profit for the year (160-170)	**180**	**7 633 387**

2. At the next stage of calculations, we reflect other comprehensive income in the accounting accounts. For this we use the accounts suggested above. The essence of the methodological procedure we propose is that other comprehensive income is initially accumulated in the accounts intended for each of these incomes. At the end of the year, the balances in these accounts are transferred to the corresponding private equity reserve accounts. In the statement of private capital flows, we consider the most appropriate practice to open a column of reserves and other reserves to increase the value of fixed assets and intangible assets. Based on these rules, we make accounting entries in the following table (Table 3.5):

TABLE 3.5THE ORDER OF REFLECTION IN THE FINANCIAL STATEMENTS OF OTHER AGGREGATE PROFIT OF "JAMBAY" JSC FOR 2020 UNTIL DECEMBER 31[8]

s/n	**Contents of operation**	**Linking accounts**		**Sum**
		Debit	**Credit**	
1	Increase in value from revaluation of fixed assets	0110-0130	10010	28 400 000
2	Gains (losses) on financial assets measured at fair value at the company's option through other comprehensive income	0610 or other accounts related to financial assets	10021	5 800 000
3	Actuarial gains (losses) for defined benefit plans (unclassified component)	6990 "Accounts accounting for actuarial obligations"	10030	-
4	Effective money planning results	5110-5700	10070	-
5	The contribution of like-minded people to the increase in the value of the property	0610-1690	10040	-
6	Exchange rate differences from translation of foreign subsidiaries	5210	10060	-

7	At the end of the year, when other comprehensive income is transferred to reserves:	10010	8510	28 400 000
	Increase in the value of property, plant and equipment.	10021	8540 Other reserves	5 800 000
	Increase in the value of financial assets.	10030	8540	-
	Actuarial advantages and disadvantages. Money planning.	10070	8540	-
	Employee contributions to property value.	10040	8540	-
	Exchange rate difference from translation of foreign subsidiaries.	10060	8540	-

The methodological procedure suggested in this table has several advantages. **First,** changes in other comprehensive income during the year are first accumulated in the accounts in which this income is recorded, and then the final result is transferred to reserve capital. This, in turn, reduces the income from a previous increase in property, plant and equipment during the year as a result, for example, of a loss in the value of property, plant and equipment transferred to the corresponding other comprehensive income account. **Second,** the data in the other comprehensive income accounts make it easier to aggregate the data when completing the Other comprehensive income section of the statement of total comprehensive income. It allows you to receive data for replenishment not from the reserve capital, but from the data in the accounts for these purposes. This methodological procedure also meets the requirements of international standards and is distinguished by its effectiveness.

3. Now, based on the information in the other comprehensive income accounts, we will complete the "Other comprehensive income" section in the statement of comprehensive income. To do this, we enter the data in the format recommended by PwC Academy above and formulate the corresponding report indicators (Table 3.6).

TABLE 3.6PART OF THE OTHER COMPREHENSIVE INCOME OF JSC "JAMBOY GRAIN PRODUCTS" FROM THE TOTAL COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 DECEMBER 2020 (OTHER PART OF COMPREHENSIVE INCOME ONLY)[8]

	Line code	**Sum**
Other comprehensive income: components that cannot be reclassified in the income statement		
Revaluation of fixed assets	190	28400000
Gains (losses) on investments in equity instruments carried at fair value through other comprehensive income at the option of the Company	200	-
Actuarial gains (losses) for defined benefit plans	210	-
The contribution of like-minded people to the increase in the value of the property	220	-
Changes in the fair value of financial liabilities associated with their credit risks	230	-
Income tax applicable to components that cannot be reclassified	240	-
Components that can be reclassified in the income statement		
Gains (losses) on financial assets (equity instruments) measured at fair value through other comprehensive income	250	5 800 000
Exchange rate differences when translating foreign subsidiaries	260	-

Effective money planning results	270	-
Income tax applied to the reclassified components	280	-
Total other gross profit after tax (190+200+210+220+230+240+250+260+270+280)	**290**	34 200 000
Total comprehensive income (180+290)	**300**	**41 833 387**
Profit: **Controlled shareholders**	**310**	**41 833 387**
Uncontrolled participation	**320**	**-**

This statement is a continuation of the statement of comprehensive gross income above. The report shows that the joint-stock company received income only on two items of other comprehensive income. No operations were carried out for the rest of the items. Total comprehensive gross income consists of the enterprise's profit and loss and other comprehensive income. There is no uncontrolled participation in the company. Therefore, all comprehensive income is attributable to controlled shareholders.

4. At the next stage of calculations, it is necessary to prepare a report on the change in private capital. Its composition and content are as follows (table 3.7).

TABLE 3.7"JAMBAY GRAIN PRODUCTS" JSC PRIVATE EQUITY REPORT 2020 ENDED DECEMBER 31

	Authorized capital	**Share capital**	**Undestributed profits**	**Vehicle revaluation reserve**	**Other reserves**	**Total capital**
Incoming balance	248 420 000	6 518 000	150 448 500	58 425 123		463 811 623
Net profit			7 633 387			7 633 387
Dividend			(4 580 032)			(4 580 032)
Other comprehensive income				28 400 000	5 800 000	34 200 000
Outgoing balance	248 420 000	6 518 000	153 501 855	86 825 123	5 800 000	501 064 978

The advantage of this report is that it shows an increase in retained earnings compared to net income. The net profit indicator is taken from line 180 of the profit and loss section of the statement of comprehensive income. Dividends are paid out of net income, which results in a decrease in net income. The rest is reflected in an increase in retained earnings. There are two columns for capital reserve. One of them is the reserve for property, plant and equipment, the reserve for revaluation of intangible assets, and the other is the reserve for the remaining items of other comprehensive income. You can open a separate column for each item of other comprehensive income, but since there are many other items of total income, the report format may be larger than normal, which makes it inconvenient to use.

4. The data of the statement of changes in private capital must correspond to the data of the balance sheet (table 3.8).

TABLE 3.8REFLECTION OF ITEMS OF DIRECT INVESTMENT IN THE FINANCIAL STATEMENTS OF "JAMBAY GRAIN PRODUCTS" JSC FOR 2020, WHICH ENDS ON DECEMBER 31

Reporting elements	**Sum**
Capital and reserves: Share capital	248 420 000
Share capital	6 518 000
Undestributed profits	153 501 855
Revaluation reserve for property, plant and equipment	86 825 123
Other reserves	5 800 000
General	**501 064 978**

These reported data should be consistent with the reported data on the movement of direct investment. The information in the report describes the financial condition of the company.
Based on the above research, the recognition, measurement and reporting of other comprehensive income can be divided into the following stages:

The first step is the recognition of other generalized income, their classification into items that can and cannot be reclassified into profit or loss;

The second step is to reflect other comprehensive income in the accounting records;

The third step is to develop a format for the part of the income statement in the general income statement and fill it out based on the accounting data;

The fourth step is to develop a format for the other part of the consolidated income in the statement of comprehensive income and fill it out based on the accounting data;

The fifth step is to prepare a statement of changes in equity based on the data in the statement of comprehensive income;

The sixth step is to compare the financial statement and the private equity statement data.

Based on the study of other comprehensive income, the following conclusions can be drawn:

1. Other comprehensive income was described based on a study of international standards and industry literature. These gains represent unrealized gains that are not recognized in the income statement, which are recognized in the statement of comprehensive income, and the final financial results are reflected in the statement of changes in equity. Accounting for other comprehensive income is provided for and permitted by separate IFRSs. The study identified five characteristics of other comprehensive income.

2. The components of other comprehensive income are given, their definitions, for the purpose of classification, are divided into two categories. The first category is components that cannot be reclassified in the income statement. The second category is components that can be reclassified in the income statement. The constituent parts of these components have been identified in accordance with international standards.

3. To reflect other comprehensive income in accounting, a chart of accounts was proposed for opening accounting accounts for each item of other comprehensive income, and their application was demonstrated using practical examples.

4. Based on practical examples, methodological rules have been developed for the application of the methodological procedure for drawing up the profitable and unprofitable part of the statement of other comprehensive gross income for the reporting year, as well as other parts of

the total income at domestic enterprises. A six-step methodical procedure for reflecting other incomes in accounts and reports is proposed.

5. The methodological aspects of reflecting other total income of joint-stock companies in the statement of changes in private capital and financial statements have been improved.

This methodological procedure serves to generate useful information for users of information that accurately reflects other total income in the accounts and reports.

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ARTISTIC DESCRIPTION OF THE HERO'S SPIRIT IN ERKIN VOKHIDOV'S EPIC "NIDO"

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ABSTRACT

In this article, the author tries to study the work of Erkin Vahidov. The author analyzes the artistic significance of Erkin Vahidov's epic "Nido". Erkin Vahidov's wide range of creative heritage, high art, unique style of expression have a special place in the development of Uzbek literature in the second half of the XX century - early XXI century. The poet's delicate lyrical poems, humor, which embodies the desire to see the native people without flaws, epics with deep layers of meaning and a unique world of images are rare examples of our national literature. In his works, the artist sang about the pain of the people, devoted all his inspiration and energy to the deep revelation of the human psyche, the skillful depiction of high ideals.

KEYWORDS:*The Epic "Nido", the War Years, Human Destiny, the Human Psyche, Artistic Methods.*

INTRODUCTION

Erkin Vahidov's wide range of creative heritage, high art, unique style of expression have a special place in the development of Uzbek literature in the second half of the XX century - early XXI century. The poet's delicate lyrical poems, humor, which embodies the desire to see the native people without flaws, epics with deep layers of meaning and a unique world of images are rare examples of our national literature. In his works, the artist sang about the pain of the people, devoted all his inspiration and energy to the deep revelation of the human psyche, the skillful depiction of high ideals.

The poet wrote about ten epics. His epics "Tashkent sadosi", "Quyosh maskani", "Buyuk hayot tongi", "Charog'bon", "Baxmal", "Palatkada yozilgan doston", "Nido", "Ruhlar isyoni", "Istanbul tragedy" are high examples of this genre. in terms of It is known that the epics "Nido", "Ruhlar isyoni" and "Istanbul fojeasi", which made a worthy contribution to the development of modern Uzbek epics, brought fame, especially to the poet. Although Nido was written in 1964, it has not lost its value. The epic has taken root in the hearts of our people and is still loved and read.

The play depicts the wounds of the Second World War in the hearts of our people. In the “Dedication” part of the epic, the artist depicts the inner feelings of the protagonist, the feelings in his heart in an impressive style, artistically. In the preface of the work, the language of the “lonely monument” of the lyrical hero-victim of war is interpreted in a highly artistic way. By the phrase “From under Mother Earth”, the poet is referring to the flames of war. “Son!” The tragic effect of war on human life through the expression of the suffering of a child who has not uttered the word “Father” for twenty years, whose body is in agony, whose heart is burning with pain, who has no tears in his eyes, who feels the pain of a black bullet piercing his father's chest. deeply expressed.

The epic “Nido” is also significant in that it is based on a biographical interpretation. “First of all, this epic is distinguished by high art, sincerity, truthfulness, deep humanism,” writes literary scholar Umarali Normatov. - The epic is dedicated to war and the human problem. This problem, which has been repeatedly mentioned in the literature, is uniquely worked out in Erkin Vahidov's epic, and his personal involvement in the event has given a wonderful sincerity to the work. ”

While writing about the heavy steps in the play, the soil trembling from the impact of the boots, the poet asks the anguished questions: “Where are so many people going? Isn't that how far they go? ” At that moment, the protagonist suddenly sees his father among them:

Ana, ko’rayapsanmi?

Mening dadamlar!

Dada!!!

Ovozim hech chiqmaydi biroq.

Yuguraman - ortga ketar qadamlar.

Yig’layman – ko’zimga kelmaydi namlar,

Murg’ak vujudimda faqat zo’r titroq!

Erkin Vahidov is a master of the image of the soul. Through words, the poet is able to express emotion with all its complexity as clearly as a skilled artist. The lyrical protagonist is the child's “Father!” the fact that he does not make a sound when he calls, that he does not step back when he runs, that he does not get tears in his eyes when he cries, that he does not tremble in his body - every word in these lines has a universal meaning. Everything serves to depict the mood of the hero in bright colors. The combination of creative intent and image at this level confirms the words of the literary critic Ibrahim Gafurov: He seeks the logic of every event, focusing all his attention on the logic of the events. He is very strong in logic.

These verses have a lightning effect on the heart of the reader. As he reads the epic, he deeply feels the fiery rage of the protagonist. This is: “Literary creation is always a journey into the world of words. The Creator sees the Word as a living soul and speaks with the Word. I want what I have written to be a live conversation in such a lively language, ”said Erkin Vahidov.

In the epic, the image of the hero's psyche is also impressively expressed through the mother-child dialogue. The mother's words of encouragement to her child resonate in the student's heart:

Ellarning erk degan

Sof tilagi deb,

Jahonning nurafshon

Kelajagi deb,

Ofat solmasin deb

Olamga qotil,

Otang uzoq yurtda

Jang qilayotir.

While the poet describes the “bright future” in the above verses, it instills in the child's heart a confidence in the future, a love of life and, at the same time, a sense of pride in his fighting father. Onaizor's words that these days will surely pass, that human wounds will end, that the world will become a world without war, but that the sorrows, stains, and heartaches of a terrible war will remain, are in harmony with the author's dreams.

The story of writing a letter to the father of a child in the epic, Rustam aka, who has no legs, Khol aka, who could not embrace his son because he had one arm left in the war, is the curse of Talat’s inability to come to school because of his father’s death. The storms in the heart of the protagonist of the epic - all confirm how skillful the poet is in the depiction of the soul. In these images, the psyche of a child with anxious eyes waiting for a letter from his father is depicted so vividly and emotionally that the pain in them burns in the heart:

Hijron kechalari g'oyatda uzun,

Ayriliq yo'llari olis nihoyat.

Kuchaga chiqaman yuz bora har kun,

Ko'zlarim nigoron,

Kelarmikan xat?

The poet's personality is the image of the poet's personality, which is full of anguish and sincerity: is proof that he was able to describe the psyche of the nation through his psyche.

The fate of four soldiers who fought valiantly against an entire regiment; in this battle between danger and courage, evil and justice, the lead in their chests, the resting like an innocent baby in the mother's womb after a heavy night's battle, is a poetic depiction of the reality that underlies the plot of the epic. Through the art of diagnosis, the poet depicts this event, which is associated with the tragic fate of human society, in harmony with the image of the landscape. The four heroes wept uncontrollably this morning, the river cried with its head on the shore, the white, fluffy clouds shattered, the sun's rays shed tears this morning - all this served as a perfect poetic depiction of the hero's psyche. The protagonist:

O'rmonlar shovillagan

Olis yurtda xali ham

Nomsiz tepalik uzra

Uxlab yotibdi otam.

The cry of is interpreted in proportion to the mourning of Mother Nature.

The image of Mother Earth groaning from the wounds of the sick, her heart breaking from the horrors of the atomic umbrellas, and calling with a fiery sigh in her chest, is in harmony with the cry in the psyche of the protagonist. Now it is the great responsibility of modern man to lead this troubled world, this troubled world, from storms and sunny roads to a brighter future. That's what the poet means!

The story ends with the following lines:

Avlodlar uchun ham

Qutlug' bo'lur albat

Yer uzra to'kilgan ko'z yosh, qon va ter.

Bepoyon kenglikda

Charx uradi abad

Ulkan yurak shaklidagi Yer ...

It is no coincidence that the image of the earth is likened to the heart. Because Erkin Vahidov imagines Mother Earth as a living being. It encourages mankind to live in peace in the bosom of this Mother. So that mothers do not lose their beloved spouse, children's valine - father! So that mankind does not lose humanity to the box of lust! After all, all humanity is the children of this heart-shaped Mother Earth.

In short, Erkin Vahidov, through the depiction of the heroic spirit in the epic, highly artistic interpretation of the universal problem that the preservation of the peace of the Mother Earth, the peaceful coexistence of the children of Adam is the main condition for achieving a bright future.

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A REVIEW ON THE USE OF DATA MINING TECHNIQUES FOR MEDICAL DATA CLASSIFICATION

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ABSTRACT

This paper looks at the current practices and future possibilities of using data mining methods to classify medical data. It focuses on the most important advanced classification methods for improving classification accuracy. Previous research has produced literature on the categorization of medical data using data mining methods. Data mining methods are highly successful for the job of categorization, according to substantial literature research. This study compared and contrasted the present state of medical data categorization. The study's results revealed that the current categorization of medical data might be enhanced further. Nonetheless, additional study is needed to determine and eliminate ambiguities in categorization in order to improve accuracy.

KEYWORDS:*Bayesian Network, Decision Tree, Diagnosis, Multilayer Perceptron, Support Vector Machine.*

21. INTRODUCTION

Marketing, customer relationship management, engineering, and medical analysis, expert prediction, web mining, and mobile computing are just a few of the areas where data mining has been utilized [1]. Data mining has recently been used to effectively identify healthcare fraud and abuse situations. Clinical choices are often made based on physicians' intuition and experience rather than the database's knowledge-rich data. This approach leads to unfavorable biases, mistakes, and high medical expenditures, all of which have an impact on the quality of care given to patients. This proposal has promise since data modeling and analysis techniques, such as data mining, have the ability to create a knowledge-rich environment that may enhance the quality of healthcare choices considerably [2]. Successful data mining applications have given the incentive for all parties engaged in healthcare-related businesses to fully use them, as they have recognized that data mining is critical in the collection of important information for all sectors concerned.

Healthcare insurers are more able to detect fraud and abuse, health managers are better able to make better choices, particularly when it comes to customer management, and healthcare practitioners are better able to provide better services and treatments [3]. Traditional techniques cannot handle and evaluate the massive quantities of data produced by healthcare transactions because they are too complicated and voluminous. By finding patterns and trends in huge quantities of complicated data, data mining may help people make better decisions. As financial constraints have increased the need for healthcare organizations to make choices based on clinical and financial data, such analysis has become more important. While maintaining a high level of care, data mining insights may impact cost, revenue, and operational efficiency. Data-mining-enabled healthcare companies are better positioned to fulfill their long-term requirements.

Computers and their peripherals have become cheaper and more widely accessible in recent years, and sophisticated data mining methods have emerged in tandem with the development of information technology. Traditional and more current advanced classification algorithms are included into these new generation data mining methods. Both classification methods are used to handle multidimensional datasets, user inference and prior knowledge, web data, erroneous data points that induce over fitting of models, human ability enhancement, noisy dataset cleaning, multimedia dataset mining, and incremental datasets. For all of the databases described above, interdisciplinary data mining methods and methodologies may be utilized to predict the effect and find significant connections in the data with the goal of extracting valuable information for knowledge creation.

To apply data mining algorithms to medical data, researchers must have a thorough understanding of the many types of data mining algorithms and their purposes. The two types of data mining techniques are descriptive (or unsupervised learning) and predictive (or supervised learning) [4]. Descriptive data mining classifies data by identifying item similarities (or records) and discovering previously undiscovered patterns or connections in the data, allowing users to recognize a large data set. Descriptive data mining is a research method. Clustering, association, summarization, and sequence finding are all part of it [5]. Predicting rules (also known as classification/prediction models) from (training) data are used to unpredicted/unclassified data in prediction data mining, which includes classification, regression, time series analysis, and prediction.

Three of the most often used data mining algorithms (classification, clustering, and association) are described here, along with recommendations for their usage, to help academics understand the significance of data mining and the use of data mining methods. As a result, a number of models have been fitted to the data in attempt to uncover hidden patterns. In this model, the method that produces the most accurate output and relationships pattern in the observed datasets is deemed the most efficient. This method accomplishes the goal of data mining. Classification, regression, clustering, finding association rules, and sequence analysis are all model functions used in current data mining techniques. However, as data mining becomes more popular, the task becomes more difficult. Soft computing has emerged as one of the promising data mining techniques in this field for dealing with these issues without utilizing conventional statistical approaches. For conventional software and hardware, digital medical data is not only massive in size, but also complicated in form. Traditional systems' inability to handle large datasets is due to a number of reasons, including:

- A wide range of organized and unstructured data, such as handwritten doctor notes, medical records, medical diagnostic pictures (MRI, CT), and radiographic films
- The presence of noisy, heterogeneous, complicated, longitudinal, varied, and big datasets in healthcare informatics.

- The need to improve medical problems such as quality of treatment, sharing, data security, and cost reduction, which are not well handled in conventional systems

As a result, solutions are required to handle and analyze such complex, varied, and large datasets in a reasonable amount of time and storage capacity in order to improve insight and decision-making. As a result, the purpose of this article is to provide an overview of the current and most often used techniques for categorizing medical data. Existing data mining-based methods to classification of medical records are being updated by emphasizing the various categorization algorithms for clinical imaging applications. There are three parts to this study. The second section contains a discussion that discusses data mining categorization, a comparative study of data mining methods, and the findings or outcomes. In addition, Section 3 of the article concludes with a conclusion.

22. DISCUSSION

22.1. Classification in Data Mining:

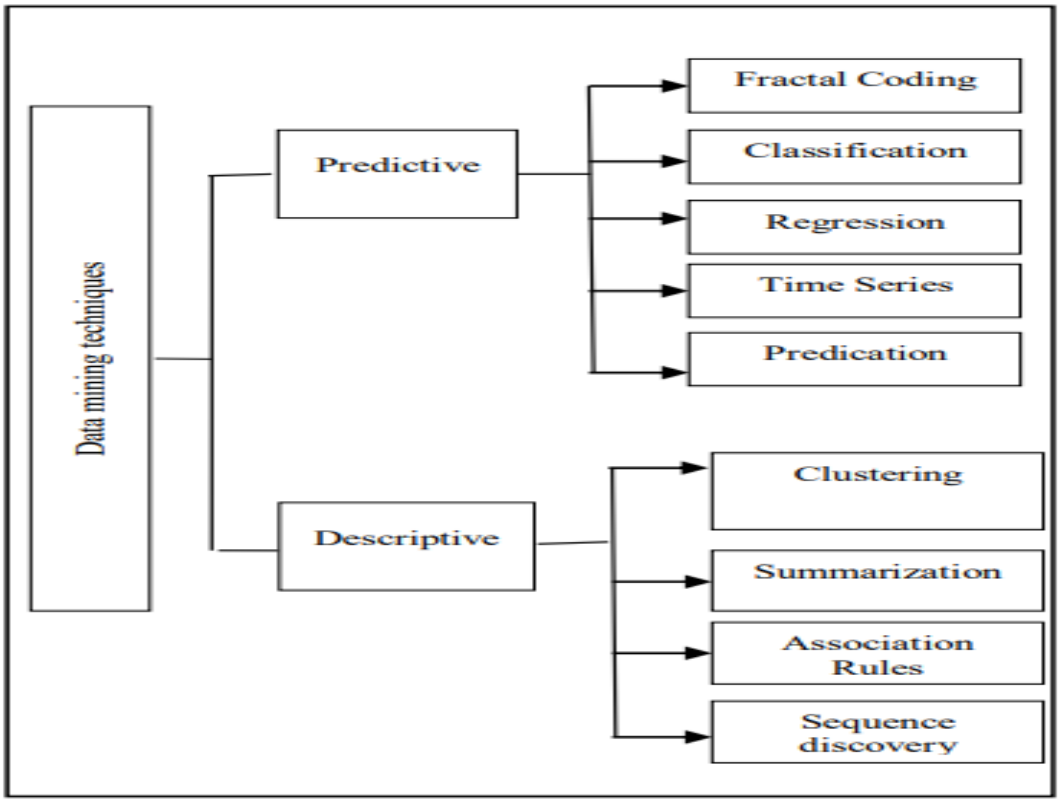

Fig. 1. Data Mining Techniques [4]

Categorization is a technique used in data mining to predict the memberships of a collection of data examples. To identify data linkages in large datasets, this method employs sophisticated data analysis. Medical databases provide difficulties for pattern extortion because to their complicated characteristics. Data mining techniques may be classified into two types: statistical and machine learning algorithms. Data mining methods are divided into descriptive and predictive categories as shown in Fig. 1. Descriptive mining tasks reveal the database's general data characteristics. Inference is performed on the data for predictions in predictive mining jobs, where forecasts are produced on explicit values based on patterns discovered by previous outcomes. Descriptive data mining offers features and descriptions for the data collection without having a specified goal.

Because: a) it is user-friendly and prediction is based on past circumstances; b) it operates by learning from past data; c) data from multiple resources is managed and only required data is

extracted; and d) models are easily updated by relearning, past information, and changes in trends, data mining techniques are effective and predictive for future patterns. This is what makes it dependable and useful in the classification of medical images. The three learning strategies in data mining algorithms are supervised (the technique performs with a number of instances with labeled data whose values are nominal in classification tasks, or numerical in regression tasks), unsupervised (the dataset contains unknown labels, and the algorithmic program aims at grouping examples based on the similarity of their attribute values, classifying a clustering task), and unsupervised (the dataset contains unknown labels, and the algorithmic program aims at grouping examples based on the similarity of their attribute values, characterizing a cluster [6].

22.2. Comparative Analysis of Data Mining Techniques:

Although the results of classification algorithms are impressive, none are yet varied and flexible enough to be widely recognized in the medical data classification field. In medical data, categorical variables may be helpful for making choices and generalizing information. Categorical data (e.g., disease and non-disease classifications) is useful for data mining techniques and also simple to extract medical data. Table 1 shows a short overview of data mining methods.

TABLE 1. DATA MINING TECHNIQUES REPRESENTATION [7]**.**

Approach	Representation	Pattern Recognition Models Recognition Function	Error Estimation
Template Matching	Sample, pixels, curves	Correlation, distance measurement	Classification error
Statitical	Featuers	Discriminatio n function	Classification error
Neural networks	Samples, voxel pixels, featuers	Network function	Mean square error

With the development of data mining for illness diagnosis and prediction, a large number of efforts for a range of medical picture classifications have been suggested [8], [9]. However, the many assumptions and hypotheses used in these techniques vary significantly. The section examines the rapidly growing corpus of work on the development and use of classification techniques to fundamentally important issues in medical image categorization. Meanwhile, classification researchers depend largely on stored data archives like the UCI repository to perform comparison studies, which enables novel algorithm concepts to be tested on established issues. Table 2 shows an overview of data mining methods. Data mining methods are used in mining medical data, and include association rule mining for identifying common patterns, prediction, classification, and clustering, which is a new use in the medical sector [10]. To date, many studies have been conducted, and intelligence and decision support systems have been created to improve illness detection and prediction, particularly in the areas of heart disease, lung cancer, and remote health monitoring.

The purpose of this section of the paper is to highlight the needs of the healthcare sector as well as possible solutions. Here are some recommendations for using various data mining techniques: Prior to using the classification method, it is essential to identify the superfluous characteristics that obstruct the processing job. They not only create noise and disrupt the process, but they also have an impact on the performance of the classifier. Statistical techniques are used to identify

them. The feature selection techniques, on the other hand, are used to pick functional characteristics in order to enhance the classification model's accuracy and success. As a consequence, the researchers discovered that no one classifier produces the optimal results for each dataset. Each dataset is divided into two sections – training and testing – to evaluate the performance of classifiers. A classifier is selected based on its performance in comparison to other available classifiers, which is evaluated using a testing dataset. To guarantee correctness, the training and testing datasets are subjected to cross validation.

TABLE 2. SUMMARY OF DATA MINING TECHNIQUES

Data Mining Technique	Advantage	Disadvantage
SVM	• Better Accuracy as compare to other classifier. • Easily handle complex nonlinear data points. • Over fitting problem is not as much as other methods.	• Computationally expensive. • The selection of right kernel function. For every dataset different kernel function shows different results. • Training process take more time.
Decision Tree	• No requirements of domain prior knowledge in the construction of decision tree. • It minimizes the ambiguity of complicated decisions. • It is easy to interpret and it also handles both numerical and categorical data.	• It generates categorical output. • Performance of classifier depends upon the type of dataset.
ANN	• Easily identify complex relationships between dependent and independent variables. • Able to handle noisy data	• Local minima. • Over-fitting.
Bayesian Belief Network	• It makes computations process easier. • Have better speed and accuracy for huge datasets.	• It does not give accurate results in some cases where there exists dependency among variables.
K-NN	• It is easy to implement. • Training is done in faster manner	• It requires large storage space. • Sensitive to noise.

Classification rules are primarily concerned with determining the class of characteristics, but they do not consider the connections between them. While association is beneficial for detecting the connection or correlation between several characteristics and produces association rules, domain experts may utilize this information to eliminate unimportant association rules and examine just those that are relevant to making important decisions.

22.3. Findings:

According to Table 1, each data mining modality has its own set of features to deal with. Despite all attempts, there is currently no widely accepted technique for categorizing medical data. The most obvious reason is that in the medical field, very accurate data and a very low incidence of false negatives are needed. However, there are certain generic techniques that can be used with a wide range of data. Specialized techniques for specific applications that take into account previous knowledge may help obtain better results. Over the last three decades, medical data has progressed in the following three areas:

- The creation and use of sophisticated classification algorithms.
- Making use of a variety of characteristics.
- Medical data is included into categorization processes.

Nonetheless, there are obstacles. Data mining technique, user engagement, performance, and scalability are among them. Other concerns include the investigation of data mining applications and their societal consequences. As a result, deciding on a suitable strategy to a classification issue may be a tough decision. As a result, there's a chance that the present medical data

categorization jobs may be improved further. Because data mining methods for medical data categorization have yet to be thoroughly explored, there is a lot of room for further study and new avenues for future research.

23. CONCLUSION

It is noted in this paper that data mining methods have been used to classify medical data. Because there are so many records in this medical data domain, using data mining methods to aid in decision support and prediction in the area of healthcare to detect illnesses has become a need. As a result, medical data mining adds to business intelligence, which is beneficial in illness diagnosis. This paper discusses data mining methods for medical data, specifically for illnesses that are discovered and diagnosed for human health. Despite the fact that this study presents numerous possibilities and methods for big data analytics in healthcare, there are many more avenues to be investigated in the future, including different elements of healthcare data, such as quality, privacy, timeliness, and so on. This section gives a general overview of big data analytics in healthcare informatics, including themes like healthcare data characteristics (e.g., high complexity, huge size), data analytics activities (e.g., longitudinal analysis, visualization, etc.), and goals (e.g. real-time, privacy protection, collaboration with experts, etc.). The rapidly growing digital health data will help the future of health informatics.

Data mining applications may be very beneficial to the healthcare sector due to their applicability. However, it should be noted that the value of this advantage is contingent on the quality of the data. To guarantee the effectiveness of data mining applications, the collection, storage, preparation, and mining of data must all be carefully addressed, with a common clinical language and data-sharing strategy across healthcare organizations. Furthermore, beyond quantitative data, the breadth and type of healthcare data may be extended. Text mining may be used to extract information from physicians' handwritten medical notes and records. The method may be improved by combining data and text mining. Furthermore, data mining has progressed thanks to the use of digital diagnostic pictures. The researchers are optimistic that the results of this study will help improve data mining and healthcare resources, benefiting all parties involved.

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ANALYSING EXPRESSION DATA USING FUZZY LOGIC ALGORITHM

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ABSTRACT

Logic for gene expression analysis in a flurry. We developed a novel technique for analyzing gene expression data. To convert expression values into Quality descriptors, this approach uses a fluid logic that may be evaluated using heuristic criteria. We developed a model for identifying three distinct activators, repressors, and goals in a data set for yeast gene expression in our studies. The test predictions produced by an algorithm match the experimental data in the literature quite well. Algorithms can discover a far larger number of transcription factors that could be found at random in determining the function of undefined proteins. Using just expression data in the form of clustering, this technique allows the user to construct a connected network of genes. The interpretation of gene expression categorization models is usually difficult, yet it is an important part of the analytical process. We investigate the performance of small rules based on fuzzy logic in five datasets that vary in size, laboratory origin, and biological domain. The classifiers resulted in rules that are simple to understand for biomedical researchers. The classifiers resulted in rules that are simple to understand for biomedical researchers.

KEYWORDS:*Algorithm, Expression, Fuzzy Logic, Gene, Models.*

1. INTRODUCTION

Complex data mining techniques such as vector support machines, neural networks, and logistical regression were used to categorize gene expression data. They create models that are difficult for biologists and biomedical researchers to understand because to the large number of variables and factors. It would be much simpler to understand models if simple but exact rules could be generated from a little amount of training data.

People are better capable of understanding simple rules, such as 'when A is up regulated and B is down regulated,' than equations containing many coefficients, interaction conditions, and constants; some writers suggested adopting rules-based systems to analyze microscopic data.[1].Computational time stymies the creation of increasingly complex fuzzy models. Pre-processing data may be a viable option. If three genes are determined to be unlikely to fit the model before the algorithm is run, the implausible triplets may be ignored if the technique is run,

decreasing the number of triplets not examined in subsequent stages to a reasonable amount of time.

To discretize the data, many methods depend on a limited number of categories. Discretization is also advantageous since it makes data interpretation easier. The results obtained by microarrays are very accurate. Who should, however, be addressed in the communication? The meaning of this apparent precision is debatable. The values are read by scanners that measure the degree of fluorescence in the various colored channels. Because the process is vulnerable to saturation and other mistakes, biologists usually rely on experiments rather than absolute gene expression data to estimate the amount of mRNA[2]. Given human perception, reducing the numerical scale to an ordinal, in broad categories such as epiregulin, neutral, or downregulation, is possible (and desirable). Furthermore, rather of using real numbers multiplied by specific coefficients to produce a classification device, this reduction may be utilized to create simple principles that people can understand (as is the case in other modelling approaches). Two kinds of algorithms are needed to infer these rules from the data: algorithms for categorizing continuous values and algorithms for rule discovery and filtering that result in compact, understandable rules. Crisp's discretization ignores the possibility that border values across value categories are very comparable (in opposition to fussy discretization) [3]. By integrating membership values from several categories, it is possible to select a sample at the high end of the "low" category, for example. Please keep in mind that fluid memberships are unlikely, and their operators are not the same as those used in that context.

Rather than numerical numbers, fuzzy set-based computations are referred to as 'computations.' The methods contained in this paper combine fuzzy discretization of operators with induction as well as filtering algorithms developed specifically to generate a small series of short regulations useful for modeling (assignment of membership values to discrete values such as low, medium, and high or benign, malignant) and flouted operators. In several respects, this research broadens the area of flushing discernment, automates rule induction and filtering, and compares a larger number of datasets[4].

1.1 Fuzzy logic Algorithm:

The definition of fuzzy logic is a many-valued logic form in which the truth values of variables may be any real integer between 0 and 1. After evaluating all relevant facts, the fuzzy logic method aids in the solution of a problem. Then it makes the best choice feasible based on the input.Fuzzy logic is utilized in Natural Language Processing and a variety of Artificial Intelligence applications. Modern control systems, such as expert systems, make significant use of fuzzy logic. Fuzzy Logic is utilized with Neural Networks because it simulates how a human would make choices, but much more quickly.

1.2 Clustering to Improve Run Time:

The categorization of genes according to their expression is the first step toward a comprehensive and fast data analysis. It is usual to use clustering to group genes with similar expression patterns. Gene clusters may be used to give metadata for gene datasets. If a particular mix of clusters does not match the model well, it is unlikely that other genes with similar expression profile would fit the model well.

Because we believe the data can be clustered such that the majority of gene expression profiles are relatively near to cluster centers, the cluster centers and their associated gene profiles are similar, and the MSE difference is small[5]. As a result, if the model doesn't match well with a set of cluster centers, the genes around these cluster centers won't fit well into the model either. With prior knowledge of how cluster centers fit into the model, we may exclude combinations of

genes whose closest cluster centers do not fit into the model. As a result, we can save a lot of time by not looking at these combinations in the hazy model.

Although clustering does not allow us to find direct links between genes, it does allow us to effectively reduce the dataset to a few time series that accurately represent the data in general. We may claim that the expression profile of the cluster centre is substantially similar to the cluster genes if the standard difference between genes and their associated cluster centre is small[6].

1.3 Improved Algorithm:

The methods for evaluating gene expression data in the modified Woolf and Wang approach are discussed in this section. The technique is first implemented using triplet cluster centers with no error or variance constraints. Each triplet of cluster centers is categorized according to their inaccuracy in the model. The method is then applied to the genes. Before gene analysis, a file containing all triplets of the cluster and their faults in relation to the model is read. The cluster's triplets are separated by the target. There are two methods for assessing the centers of the clusters to which they belong:

- **Percentage Ranking Method:** The matching cluster triplet for the target gene cluster must be above a certain percentile. The ranking for cluster triplets is determined by the model error, with a lower error indicating a higher rank.
- **Error-Threshold Method:** In each cluster combination, a mistake score must be less than a previously specified threshold. If the related triplet cluster of the triplet gene fails to reach the specified threshold, triplet.is skipped and the algorithm moves on to the next triplet.

1.4 Developing a Generalized Model:

The generalised model is based on the idea that reactants should be kept to a minimum. To make a complex, all of the proteins in it must be present. If one or more of the genes are underexpressed, the proteins encoded by those genes will be underexpressed, resulting in inadequate complex expression due to the absence of critical component proteins. Complexes are unlikely to have a significant effect on target gene expression if not all activators or repressors required for activation or repressions of the complex target gene are substantially expressed.

Let X be a gene expression matrix containing gene expression profiles (in the basic model, X consists of two vectors xa and xr representing two expression profiles, i.e. activator and repressor, respectively), and let y be a model output, defined as y=f (X). The optimum expression profile of the target gene is represented by the y output. Let z be a vector that represents the target gene expression profile in real time. xa, xr may be extended to Xa and Xr, which are matrices with an arbitrary number of activator or repressor profile vectors.

Assume, there exist vectors x_{ma} and x_{mr},

Wherex_{mai} = min (x_{a2i}, x_{a2i} …xaji)

x_{mri}= min(x_{r2i}, x_{r2i}, … … …x_{rji})

where j is the activator number in Xij k is the repressors number in Xij and i=I, 2.

A' where N is the expression profile number. Now, xij and x contain the minimal level of expression for each of Xi and Xj's genes, at every point of expression. We may suppose that, because of the limiting reactants, xij and x are an expression profile of the activator/pressure complex. Therefore, we may utilisexij and xi as models. If we assume that we have the same assumption as Woolf and Wang did with the basic model if the mean quadratic error between the model output y and the expression profile of the target gene z is minimal.

1.5 Fuzzy rules:

If U is a collection of samples of tissues, let G = $\{g_j\}_j$ be a set of symbols of a gene, let C be a set of class labels and allow c: U as C be a partial function which applies classes to U as a result of U as a whole. Let g(x) indicate the value of the tissue sample gene g expression x. According to the aforementioned assumptions, genes are controlled at a qualitative level such as up (u), neutral (n) or downwards (d). Let L be the collection of such standards. We combine a fluid set and allow μ(l, G, x) to form part of X with the gene g and level l for each gene or qualitative level[7].

May the above-ground descriptors be D = G = L. In a proposal context, the descriptor d=(g, l) is often seen in U {x alternate with U|g(x) = l{}. This allows d to be used for a set of elements in U for which g(x) = l may be seen as a function. This view is expanded to a member function, allowing g(x) in l to include the descriptor d. In other words, with the descriptor d = (g, l) we have this d(x) = μ (l, g, x). This allows the typical crook-free combination and disconnection, as less (and max) of 2 feature functions, to be extended straight to the standard flush case.

The R = 2D = C rule is defined as an element. We designate the antecedent D by ant(r) for a rule r = (D, c), and thus c of r by cons (r).

The application r(x) of a rule r = (D, c) in respect of the element x = U shall be defined as r(x) = min d in respect of the element D(d(x) in question. (1) We consider that r(x) is the x membership of class c in accordance with r. Our idea of membership is extended to a collection of R rules and is classified accordingly. The c-type of a c-type is μR(c, x) = max({0}).

By selecting one with a maximum membership, we may now assign a class to x. In some cases, if you cannot be sufficiently sure that a case is a class, it is occasionally helpful to be able to disregard a categorization. This is how we implement this concept. If x > 00 else, leave s(x) = x.

Also add a threshold tc to every class label c = C. The tc threshold is the threshold for which class c is rejected. What we mean by categorization may now be defined properly. Given the corresponding tc criteria, the categorization of x to be determined by R is defined. Functions for length three sequence classes with R maximum membership. Formally, classR(x) = arg max c∈C (s(μR(c, x) − tc)).

If classR(x) contains more than one element, we decide to reject the classification. This happens if all classes have either been rejected or many classes have the same maximum membership for x.

1.6 Learning Membership Functions and Rejection Thresholds

In order to apply a set of rules, we must know in the rules the membership functions that are consistent with the descriptors and the refusal levels for each class label.

We present a simple system, which allows us to learn both the membership features and the refuse thresholds given a set U = U.

The triangular functions result in a sequence of length three. Our set of labels L are now ordered to have a quality of the meaning of the li mark lower than the lj mark for 0 <i<j to n − 1. An instance is that of L = {l0, l1}, in which l0 = "down" and l1 = "up." Increased sequence of real numbers sg n = |L| is associated to each gene g. We are now allowing μ(li,g,x) = μi(x), where μi for sequence sg is described above. We propose to utilise quantiles in the gene g sequence U over observed expression values, assuming expert knowledge dictates nothing else.

We used n = 2, v0 = min(g(U)) and v1 = max(g(U)) in our experiments.

Having determined the membership functions, we propose the rejection threshold for class c.

Then the tc threshold is the minimum non-zero assignment across U. We suppose that it is useful to carefully pick the training set U, preferably in cases where partial function c is specified.

2. LITERATURE REVIEW

P. Woolf et al. discussed about a fuzzy logic approach to analyze gene expression data[8].A novel algorithm for analyzing gene expression data has been developed by the author. This method use fuzzy logic to convert expression values into qualitative descriptors that may then be assessed using a set of heuristic criteria. We used a model to find triplets of activators, repressors, and targets in a data set of yeast gene expression. The algorithm's predictions for the circumstances studied match well with experimental evidence in the literature. The algorithm can also help with determining the function of unknown proteins and can detect a much larger number of transcription factors than could be discovered by chance. This method improves on existing techniques like clustering by allowing users to create a linked network of genes based only on expression data.

HabtomRessom et al. discussed about theefficiency of fuzzy logic-based gene expression data analysis[9].DNA microarray technology allows for a comprehensive study of gene expression in an organism. Researchers may be able to reverse engineer a genetic network using the amount of spatiotemporal data produced by this technique. A technique called "fuzzy logic" has been suggested for analyzing gene connections and aiding in the deciphering of a genetic network. By evaluating all combinations of gene expression patterns, this approach may find interacting genes that match a known "fuzzy" model of gene interaction. In terms of computing speed and noise resilience, this article presents advances achieved over prior fuzzy gene regulation models. The use of cluster analysis as a preprocessing technique to decrease the total number of gene combinations examined improves computing speed. This method improves the algorithm's speed by a factor of 50 while having little impact on the outcomes. The sensitivity of the model to noise is minimized by using suitable techniques of "fuzzy rule aggregation" and "conjunction," which provide trustworthy results even when the model input varies little.

Lien-Chin Chen et al. discussed aa weighted fuzzy-based biclustering method for gene expression data[10].Biclustering is a popular gene expression data analysis technique for identifying a group of genes with similar expression patterns. Despite the fact that several biclustering algorithms have been developed, few have offered a query-driven method for biologists to search for biclusters containing a specific gene of interest. In this work, we present a generalized fuzzy-based method for extracting a query-driven bicluster based on a user-defined reference gene, called Weighted Fuzzy-based Maximum Similarity Biclustering (WF-MSB). Significant biclusters in expression levels are extracted using a fuzzy-based similarity measurement and condition weighting method. WF-MSB finds both the most similar bicluster and the most different bicluster to the reference gene. On actual yeast microarray data and synthetic data sets, the suggested WF-MSB technique was compared against MSBE. WF-MSB can successfully identify biclusters with important GO-based functional meanings, according to the experimental findings.

3. DISCUSSION

Overall, the algorithm's findings match the experimental data in the literature. This isn't surprising since the program looks for links that match our understanding of how an activator, a repressor, and a target interact. As a result, the fuzzy logic algorithm simulates the mental process that an expert would use to analyze this data, using basically the same criteria that an investigator would use to identify a protein's regulatory role. However, the algorithm is automated, unbiased and wide in contrast to an expert. Expression data may be difficult to assess, and if not thoroughly examined, it can easily be misconstrued. We developed a "lens"

through which the results may be sorted without difficulty, quickly and efficiently, utilizing a data processing calculation technique.

Although the algorithm was used in this study to find the activator, repressor, and target genes just three times, additional technique variations are also possible. The activator repressor model is a simple method to demonstrate that this technology may produce physiologically realistic results. However, the technique is general and may be used to more complicated interactions and systems.Rather than providing quantitative predictions, the goal of this approach is to draw broad patterns that relate to a large number of genes. As a result, including some nonlinear effects would not help create many connections, but would add a significant computational burden to an already difficult job.

This technique is mostly used to independently verify or discover pharmaceutical targets. Traditional therapeutic target identification methods require a thorough knowledge of the disease's biology, which may be time-consuming and difficult to accomplish. Expression profiling, on the other hand, is a quick, high-performance technique that delivers a large amount of cell information in a format that can be easily processed by a computer. A fuzzy logic method for analyzing expression profile data may be used to validate the mechanism of a given goal. Furthermore, since the fumbling logic approach does not need any biological gene expertise, genes with unknown functions may be inserted just as easily as genes with known functions. This ability to identify functional indications of uncharacterized génes is a significant advantage in the creation of medicine targets, since potential drug targets may be linked back to the detailed biology.

4. CONCLUSION

Author demonstrate how clustering may save time as a pre-processing step in the construction of a fluid, logic-based model in this paper. In contrast to a modelling approach used in previous years that analyzes all gene combinations, our method utilizes self-organized mapping cluster centres to identify genes that may interact. This approach facilitates the creation of complex models, such as co-activators and corepressors, by speeding up the process of modeling gene interaction. This will increase the attractiveness of fuzzy algorithms for reversing the gene expression network.

There is presently no precise method for determining the number of clusters to keep and the percentage of cluster combinations to keep. We found that the number of clusters in a dataset from one of the four public databases used should be at least half the number of time points. When the number of clusters is increased beyond that, many clusters with similar features emerge, providing minimal information to the clusters. We're looking at using a double self-organizing map (DSOM) and adaptive resonance theory to find the right amount of clusters (ART). When it comes to selecting the proportion of cluster combinations to be preserved, 67 percent seems to be appropriate; there are significant improvements between 50 and 67 percent, but little, if any, improvement between 67 and 75 percent.

The methods presented in this paper may pave the way for the creation of a generic gene regulatory model that can be applied to any number of genes. The improvements will make utilizing fuzzy logic to analyze gene relationships using current micro array techniques more feasible.

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DISCUSSION OF ANTIMICROBIAL RESISTANCE IN THE ENVIRONMENT AND ITS IMPLICATIONS FOR ENVIRONMENTAL REGULATORS

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ABSTRACT

The significance of the environment in the worldwide development of clinically relevant antimicrobial resistance is being more acknowledged. Most of those routes responsible for both the release of resistance-driving substances into the environment are monitored and controlled by environmental authorities (e.g., antimicrobials, metals, and biocides). As a result, environmental regulators would play an important role in the creation of global and national antimicrobial resistance action plans. The lack of environmental mitigation actions in current AMR action plans is argued to be a result of our lack of fundamental understanding of many of the key issues. Therefore, we'll look at the issue of AMR in the environment through the eyes of an environmental regulator, using the Environment Agency as an example to draw worldwide parallels. Provide many thought experiments to demonstrate how various mitigation methods could work. Conclusion: AMR Action Plans do not cover all potentially relevant AMR routes and causes in the environment; and AMR Action Plans are inadequate in part due to a lack of research to guide policy, which needs to be tackled.

KEYWORDS:*Antimicrobial Resistance, Amr, Antibiotics, Biocide, Genes, Metals, Plasmid.*

1. INTRODUCTION

Many of the obstacles to fighting antibiotic-resistant infections in the clinic are well recognized, and as a result, they have been included into current antimicrobial resistance Action Plans. It is claimed that the absence of any major environmental emphasis in current AMR Action Plans and the O'Neill AMR Reviews is due to our failure to properly address basic concerns regarding AMR in the environment. It is also claimed that AMR Action Plans are inadequate and risk failing to achieve the intended objectives of guaranteeing and enhancing the effectiveness of current and future antibiotics if all causes and routes of AMR into the environment are not included or considered[1].

We want to illustrate the AMR problem through the eyes of an environmental regulator in this study, utilizing the Environment Agency as an example from which worldwide parallels may be made. We suggest that there is an evidentiary gap that limits policymakers' and environmental

regulators' capacity to safeguard the environment from AMR[2]. The method used by an environmental regulator in dealing with the AMR issue is shown by the following five questions. The inability to answer these questions at this time shows some of the evidence gaps that must be addressed in order to enable the development of a comprehensive, evidence-based AMR Action Plan:

Finally, we present several hypothetical scenarios for how various mitigation strategies might work in light of a comprehensive understanding of AMR drivers and pathways. This study is intended to serve as a springboard for future conversations between scientists, politicians, physicians, veterinarians, and regulators[3]. We also hope that this review will prompt a more comprehensive evaluation and meta-analysis of the literature in order to further evaluate and criticize the evidence base and the changing status of our knowledge gaps.

1.1.Overview On Amr Action Items At The Global, Regional, And National Levels

The World Health Organization (WHO) has outlined five strategic goals to combat AMR in its Global Action Plan:

- To raise AMR awareness and comprehension;
- To improve knowledge by conducting surveillance and study;
- To lower the risk of infection;
- To make antimicrobial agents more effective; and
- To ensure long-term investment in antimicrobial resistance.

“Establish standards and guidelines the presence of antibacterial agents and their residues in the environment, – particularly in water, wastewater, and food,” says the WHO in Goal 4 of both the Action Plan. The European Commission released a similar action plan. The O'Neill AMR Review, which is discussed below, also emphasizes pharmaceutical manufacturing. Although rivers receiving wastewater from medication factories have been demonstrated to be a major local problem with global consequences, it will be used in the next sections that it is just one of many possible pathways. Furthermore, it will be demonstrated that antibiotics are only one of many environmental drivers of AMR[4].

In a similar vein to the WHO and EC AMR Strategic Plan, the last Review on Antimicrobial Resistance, titled “Tackling drug-resistant diseases globally: Final report and recommendations,” emphasized the need to minimize antibiotic pollution in the environment. In a nutshell, it identifies three paths:

- Animal waste
- Human waste
- Waste from the manufacturing process.

Antibiotics were the focus in every instance, with no mention of other resistance-inducing substances. Two routes are also prioritized: hospital wastewater and pharmaceutical production facilities. It's tough to argue against enhancing these two routes, since they're both very important at a geographically resolved scale of analysis; nonetheless, their inputs are little in comparison to the massive input of all resistance-driving chemicals from all sources (see Figure 1). Furthermore, it is unknown if WWTPs that receive hospital wastewater release substantially more resistance-driving chemicals into the environment, with demonstrably higher effect, than other WWTPs of comparable size[5]. Hospitals are an easy target and, in many respects, a tractable target, but that does not mean they should be the first priority for decreasing AMR prevalence in the environment. The vision for these action plans, it is claimed, is not sufficiently

comprehensive to protect our natural environment. To understand these criticisms, one must first comprehend what causes AMR in the ecosystem.

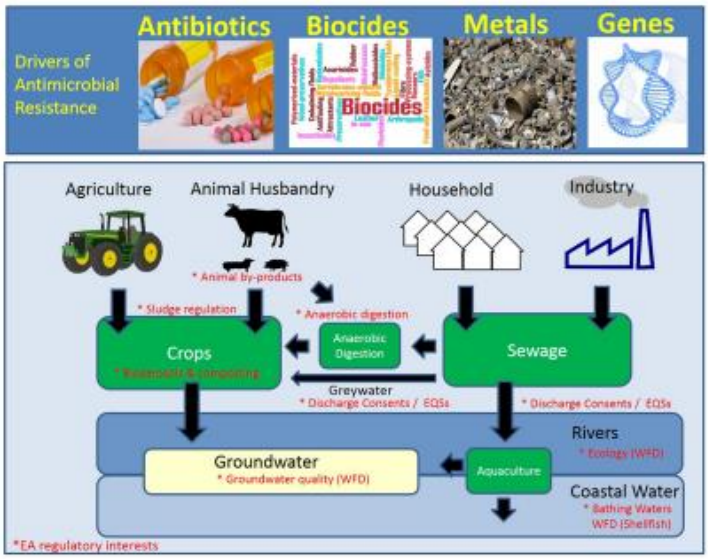

Figure 1: | Schematic of the hot-spots and drivers of antimicrobial resistance (AMR)

1.2.Antibiotics Are Among Main Causes Of Resistance.

1.2.1. Antibiotic Use In Humans On A Large Scale

In 2013, the equivalent to the quantity consumption of antibiotics in England was 27.4 DDD per 1000 inhabitants each day, which was in line with the European median of 21.3 DDD per 1000 inhabitants per day in 2011. The DDD is the assumed average maintenance dose each day for a drug being used for foremost indication in adults, and the DDD is the presumed average maintenance dosages each day for a drug being used for primary indication in seniors. Medicines were given for a total of 66 different infections, with the top 15 antimicrobial in general practice and hospitals representing for 98 and 88 percent of use, respectively. When it came to overall tonnage, India was the biggest user of antibiotic in 2010, but their per capita consumption was low when compared to Australia and New Zealand, which had the highest consumption rates of 87 and 70 units per capita, respectively. In this research, an antibiotic unit were expressed as the ratio of doses sold. China, like India, was the world's second-largest user of antibiotics in terms of overall tonnage, but had comparatively low antibiotic consumption per capita[6]. Heterogeneity in antibiotic usage seems to be replicated on a global basis. For example, disparities between nations within smaller areas, such as Europe, where Turkey used almost 300 percent more antibiotics per capita than Armenia, are nested inside broader worldwide differences. French and Greece have the largest specified daily dosage of antibiotics per capita in Europe, with both the United Kingdom surpassing the lowest usage European nation, The Netherlands, by 33%. Differences across nations are often linked to the ease for which one may self-medicate, with central and eastern European countries having more accessibility to antibiotics without the need of a prescription, resulting in increased usage and abuse. Antibiotic usage per capita in Europe is least in northern areas, moderate in eastern areas, and greatest in southern areas.

1.2.2. Antibiotic Use In Animals On A Large Scale

According to The State of the World's Antibiotics 2015, animal husbandry uses two-thirds of all antibiotics manufactured worldwide each year. Even within high-income nations, there may be substantial differences in veterinarian antimicrobial usage in food-producing animals. Norway

has the lowest sales of veterinary antimicrobial drugs among the 26 EU nations in 2013, measured in mg of antibiotic per population correction unit. PCU is a standard unit of measurement that considers the animal in a nation and their total amount at the point when they are most likely to be treated, resulting in an assessment of total kg of food-producing animals in the country. Italy, Spain, and Cyprus were at the top of the EU in terms of veterinary antimicrobial usage. The tetracycline and penicillin antibiotic classes account for the bulk of these sales, accounting for 6–56 and 11–61 percent of total antibiotics marketed in each nation for food-producing livestock, respectively[7]. These three types of antibiotics, in conjunction with sulfonamides, accounted for 71% of total sales within those 26 European Union/European Economic Market nations in 2013.

1.2.3. Greywater, Reclaimed Water, And Black Water Are All Types Of Water.

Greywater is described as water from the mains public water supply that's been used for bathing, washing dishes, or laundry, but not for toilet water. Reclaimed water is usually WWTP effluent that has been treated further to ensure that it is suitable for use in a number of purposes, such as irrigation and toilet flushing. Blackwater is sewage wastewater that has been recycled and processed. The Environment Agency would need Discharge Consent for the use of reclaimed water for irrigation, and it would have to meet British Standards. While sewage wastewater must satisfy treatment standards established by different states before being used for irrigation in the United States, animal feeding lot wastewater does not have to be treated before being applied to the soil.

Manure and sludge are applied to the land. Sludge or ‘bio solids,' a WWTP waste material rich in organic protein, oils and fats, as well as microbes and undegraded medicines, the latter of which may represent hundreds of distinct compounds ranging from sub-ng/L to >10 g/L, is produced by biological wastewater treatment. The Sludge Regulations and the Code of Practice for the Agricultural Use of Sewage Sludge govern all bio solids used on agricultural land in the United Kingdom. The rules are mainly concerned with the effect of metals in the sludge on the receiving soil and nearby water bodies, but they also cover any component of both the sludge that reduces agricultural production or puts adult or child health in danger, either directly or indirectly via the food chain.

1.2.4. Ecological Relevance Of Antibiotic Concentrations

In clinical contexts, the well-established lowest concentration pertains to the doses required to inhibit or kill a specific pathogen. The amount at which a bacterial strain provides a selection advantage to its ‘host' must be less than the MIC, or the microorganism will die. The MSC is a useful word that refers to the minimum concentration of chemical needed to give a selection edge to microorganisms having the resistance gene compared to a bacterium that is susceptible to the chemical, i.e., does not have the resistance gene. Whenever applied to even more realistic situations of many species and various chemicals, the MSC is a theoretical threshold that can be precisely established in the laboratory for every microbe and chemical combination, but it takes on a new meaning. MSCs for more complex processes are still being determined, and their more realistic circumstances may provide additional insight into the ecological significance of low antibiotic concentrations in the environment[8]. A variety of biological and physical properties variables have been found to affect the MSC. Homogeneity in antibiotic concentrations due to uneven partitioning into soil pores, sediment, biofilms, and organic matter is believed to play a key role in enabling antibiotic resistant and sensitive bacteria to coexist. The screening and survival of the more prevalent, frequent small-effect mutations is enabled by heterogeneity in the exposure of bacteria to weakly selective sub-lethal antibiotic doses within a matrix.

1.2.5. Biocides Are One Of The Main Causes Of Resistance

Biocides are disinfectants widely used in hospitals, cosmetics, home cleaning products, wipes, and furniture preservative, along with farmyards for wheel and foot washes and a variety of industrial operations, such as the prevention of fouling and souring of pipelines, including oil wells. Ethanol, formaldehyde, chlorhexidine, triclosan, and quaternion ammonium compounds are examples of common biocides. The Biocidal Substances Regulation governs biocide marketing, usage, and disposal in Europe[9].

1.2.6. Biocides' Relevant Mechanisms

Biocides affect the atmosphere in the same way as antibiotics do, via WWTPs. Improper biocide disposal, such as dilution and discharge to WWTPs, may increase the load of biocides released to the environment, as well as the possibility of resistance developing.

1.2.7. Metals Are Resistance Drivers

Household wastewater, drainage water, commercial effluent, atmospheric deposition, and traffic-related pollutants are all major sources of heavy metals in metropolitan areas. Food, clothing, home, industrial, and medical goods, as well as disinfectants, now include metal nanoparticles. Pb, Cu, Zn, Cd, and other metals have been employed in aquaculture and agribusiness as animal growth boosters and nutritional supplements, fertilizers, insecticides, and fungicides.

1.2.8. Metals' Relevant Connections

Metals follow similar routes to biocides and antimicrobials; but, depending on the presence of industry, agriculture, or waste water/storm water, the proportional percentage of each source is likely to vary. Rivers downstream of metropolitan centers, where storm water runoff is severe, and places where mining has occurred, are often affected by increased metal. The ecological significance of these diffuse and point sources of metals to the selection for resistance in the environment is yet unknown.

1.2.9. Antibiotic Resistance Genes Are One Of The Main Causes Of Resistance

Antibiotics are released into WWTPs on a regular basis, which coincides with the emergence of resistance genes. Resistance genes in wastewater come mainly from people' gastrointestinal tracts. Antibiotics and ARGs co-located in WWTPs can select for novel AMR combinations that can be shared between microorganisms via horizontal gene transfer on mobile genetic elements (MGEs), such as plasmids, resulting in an increase in the prevalence and combination of multiple drug resistance in the microbial community. The competitive and chemically demanding environment of a sewage treatment plant provides ideal circumstances for the amplification of existing resistance genes, the development of new resistance genes, and the formation of genomic assemblages[2]. Antibiotics may cause the bacterial SOS reaction, in which bacteria experience a brief genome-wide hyper mutation, resulting in genetic diversity under stressful situations. The SOS response may also induce ARG HGT, providing a route for ARG dissemination after antibiotic exposure. Abiotic sources have been discovered as one of several additional HGT factors. At an ecologically relevant scale, the relative significance of each of these HGT drivers has yet to be determined.

1.2.10. Separation From A WWTP

Antibiotics, biocides, metals, and ARGs are all introduced into STPs, but they are released as part of the: (1) effluent, and (2) sludge. Sludge may be composted, anaerobically digested, and then put to soil, or it can be burned. The percentage of antibiotics, metals, and biocide in effluent and sludge varies significantly depending on STP catchment features, the presence of hospital wastewater, the type of the STP, and its operating parameters[10]. ARGs that are liberated in treated wastewater are not completely removed by WWTPs. Sewage effluent is diluted when it enters a river, estuary, or coastal body of water. Pollutant concentrations will interact with local

flora and fauna, changing the structure and genetic composition of the microbial community. Changes in the microbial population caused by a variety of causes, including pollution, have been demonstrated to have a substantial effect on the diversity and functioning of ecological processes above ground.

DISCUSSION

The atmospheric regulator's significance of AMR routes and drivers may be stated in three major highlights: Low quantities of antibiotics, metals, and biocides in sewage effluent, rivers, sludge, irrigation systems, aerosols, aquaculture, industries, and groundwater may directly select for ARGs within the AMR pathways that are within the jurisdiction of the Environment Agency. The Environment Agency is responsible for the spread of antibiotics, metals, biocides, and ARGs into animals, plants, food, groundwater, rivers, and bathing waters. Antibiotics, metals, and biocides have sub lethal impacts on organisms, associated microbiome, and ecosystem services (e.g., rivers, coastal waters, and soil), which may have an influence on the health, production, and safety of economically significant food items as well as the broader biome.

CONCLUSION

It is critical to recognize that now the development of environmental emphasis in AMR Action Plans and indeed the O'Neill Review is, arguably, due to the following reasons: our understanding of AMR inside this environment is so lacking that there is very little that can be suggested for mitigating the impact without using the precautionary principle as the primary rationale for action, and the disciplines of pollution, environmental microbiology, and public health are all lacking in environmental focus. Unless society is willing to bear the non-trivial expenses of a conservative approach, such as higher water rates to pay for significant improvements in WWTPs, there will be a need to prioritize research that solves the previously mentioned "Knowledge Gaps." The fact that such an investment in improving WWTPs may result in numerous "victories" via the elimination or decrease of other pollutants and dangers should not be overlooked. There is reason to be hopeful, however, since for the first generation, the seven UK Research Councils have joined forces to finance long-term cross-disciplinary, integrated research on AMR. A Funders' Forum against Antimicrobial Resistance has also been formed to offer a framework for providing a better integrated research portfolio and maximizing the effect on both national and international policies and actions.

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COMPARISON OF SMART FABRIC SENSORS & E-TEXTILE TECHNIQUES

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ABSTRACT

This article examines recent advancements in the area of sensitive texture sensors and electronic material advances, which is rapidly changing and evolving. It summarizes the basic standards and methods used in the construction of texture sensors, as well as the most often used materials and processes in electronic materials. This study demonstrates that depending on the degree of mixture into the texture stage, inborn and external changes to material substrates may be used to determine utility. Texture sensors may be custom-made to measure power, pressure, synthetic chemicals, moistness, and temperature variations, as shown in this study. Materials, connections, texture circuits, interconnects, epitome, and creative methods linked to texture advancements are versatile and flexible, but less powerful than its traditional hardware counterparts. The findings of this review suggest that by combining several types of material-based utilitarian components, a complete keen texture framework is possible. This study serves as a first step in standardizing brilliant texture detection algorithms and e-material production methods.

KEYWORDS:*E-Textiles, Fabric Sensors, Textile Sensors, Techniques.*

1. INTRODUCTION

Textures are the newest silicon wafers, and their emergence of useful devices and exquisite figure has piqued attention. Despite the fact that this was not a replacement for conventional devices, this sector has a market that is now in its early stages of development since it lacks a standardized set of systems or components. It has evolved into a byproduct of wearable technology advancements. This article includes a review of important developments for improving textures with long-term utility, with a focus on electrochemical sensors[1]. Sharp texture sensors (SFSs) are textures that are penetrated with detecting characteristics; they are sensitive to a variety of physical and chemical changes, such as changes in temperature, pressing factor, power, and electrical current, among others. At any level, detecting components may be merged into textures if the underlying texture component is changed or sharpened. SFSs are required for the more generalized class of smart texture transducers (SFTs), which are textures that have been manipulated or changed to serve as sensors, actuators, or perhaps other types of

transducers. The omnipresence of textures makes them an excellent vehicle for the deployment of sensors in close proximity to humans[2].

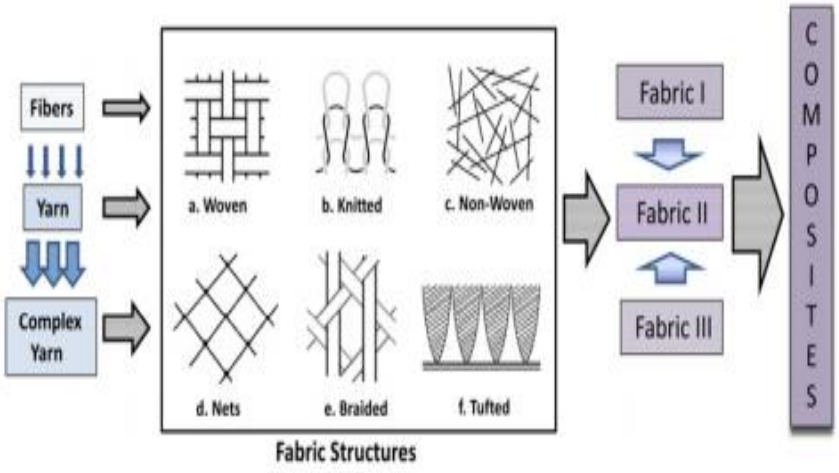

Figure 1. Fabric construction platform and hierarchy. Fabric structures: (a) woven, (b) knitted, (c) non-woven, (d) nets, (e) braided and (f) tufted, which can be assembled in layers (e.g., three layers) to form composite structures

SFSs are influenced by the fabric structure platform. Curtains are fibrous materials with a hierarchical structure. Muscle fibres are the smaller units, or initial level of integration, which are distinguished by a high length-to-thickness ratio; these components interlace to create thread. The second stage of integration occurs when thread is twisted to create yarn. Yarn is transformed into fabric, the third stage of integration, via a variety of methods also including weaving and knitting. Synthesis or compound fabric units are used at larger sizes of hierarchical levels[3]. The basic development of fabric structures, from fiber to cloth, is shown in Figure 1. A distinction must be noted: thread is often referred to as yarn; however, yarn is typically thicker than thread, and it may be produced directly from the component fibers in certain cases. Textiles were defined as any substance that is made up of fibers. Fabrics are included in this category, as is any material created by weaving, knitting, or other fabrication methods. A fabric utilized for a particular purpose is referred to as cloth. Textiles and fabrics are being used interchangeably in this study.

The type or origin of the fiber units, which may be natural or synthetic and regenerated, is an independent element that influences the fabric's ultimate properties. Synthetic fibers offer a higher mechanical compliance and far less water absorption compared natural fibers. This nature of the fiber affects a fabric's sensitivity to chemical and photonic reactions, coating compatibility, adhesion, water absorption, overall fabric lifespan, thus the origin of fibers used in STF design should be a key design concern[4]. The humidity absorption characteristics of some fibers, for example, may impact their dimensional stability, along with inherent mechanical, frictional, and electrical properties, as well as their form, stiffness, and permeability. If metalized connecting components are to be integrated with the fabric structure, a hydrophobic platform may be chosen to minimize the risk of short circuits caused by perspiration or excessive humidity. Hydrophilic textiles, on the other hand, may reduce the accumulation of static electricity, which may be a danger to electronics boards connected to the bottom of an SFT.

- *Sensors.* Fabrics which are given sensing properties of diverse physical nature, such as capacitive, resistive, optical and solar[5].

- *Actuators.* Fabrics which are able to actuate or move some aspect of their environment. Examples of these types of fabrics are electroactive fabrics and axenic fabrics.
- *Batteries and energy harvesting.* Fabric based batteries sand fabrics which use the kinetic energy or the thermal energy of the wearer or their environment to generate electrical power.

1.1.Improvements To The Platform For Smart Sensing Capability

Fabric platforms or substrates may be changed at any level of the structural hierarchy to convert them into SFTs. All of the platform changes that will be addressed directly apply to SFSs for the purposes of this study. The creation of fibers composed of conductive materials through which a textile may be produced would be a level-one alteration. The exchange of yarns with sensitive yarns would be a level-two modification. This is what e-textiles look like. A level-three alteration would include changing a fabric's surface, such as with a coating, to give it perceiving capabilities[6]. The employment of several sensing fabrics to create a sensing composite would be a level-four modification. All of the sensors described in the next sections may be categorized as having undergone intrinsic or extrinsic changes, a distinction that will be addressed later.

1.2.Extrinsic Changes To Enable Sensing Capabilities

Improvements to the fabric structure that allow sensing features may be made at any level. Fabrics that have been changed extrinsically, i.e. by adding discrete or self-contained sensing components, are known as "electronic textiles," and they typically include the superficial attachment of ordinary electronic parts such as resistors or integrated circuit chips to the fabric. Extrinsic or exterior modifications to fabric substrates, such as fiber, yarn, or woven fabric, include coatings. Screen printing, ink-jet printing, electrodeposition, ultrasonic cleaning plating, sputtering of thin films, vapor deposition, and thermoset coatings are some of the coating methods used in fabric sensors. The tensile, shear, and bending characteristics of textiles are all affected by coatings[7].

1.3.Intrinsic Fiber, Yarn, And Fabric Sensor Characteristics Changes And Design

Materials that are responsive to mechanical or chemical stimuli may be used to make fibers and yarns. As fibers and yarns are replaced by sensitive fibers and yarns, integration may become more interwoven, to the point where sensing components are created from fabric materials themselves. Passive and active electrical circuit components have been claimed to be constructed from conductive yarn and other soft materials. Embroidery and silk screening of conductive fabrics are two of these techniques. Fibers composed of sensing materials may be produced in a variety of ways, both standard and unusual. Some of the techniques used to create fibers out of sensing materials include electrospinning, wet-spinning, self-assembly, carding, combing, and die extrusion.

1.4.SFS Materials, Connectors, And Manufacturing Techniques

Textiles that can respond to a broad range of stimuli, including mechanical, chemical, electrical, magnetic, thermal, and optical stimuli, are known as SFSs. The degree of complexity found in implementation varies greatly and is dependent on manufacturing techniques, materials utilized, kinds of sensing devices employed, and the type of supporting electronics used. A developing interdisciplinary research area that relies on knowledge in textile, materials, electrical, electronic, mechanical, and computer engineering is paralleling the development of SFSs. As seen in the next section, SFSs were first made utilizing an adapted electronics or e-textiles method[8].

1.5.Electrodes, Connectors, And Interconnects

SFSs are impossible to deploy without the technologies that enable the transmission and utilization of sensed data. Other fabric circuit components, sensors, and/or data collection

circuits must be linked to fabric sensors. Table 2 shows some of the most frequent connectivity techniques that have been discovered in the research; they vary depending on the kind of sensor and the application. One of the most difficult problems for SFTs is connecting to data collection, which is complicated by the fact that each application has its unique set of requirements. For example, the criteria for sensor mechanical stability in a garment are very dissimilar from those for a fabric sensor used to monitor the environment on a bookcase.

Circuit components made of textile Miniaturized and encapsulated textile circuit components may be tailored to the fabric structure. Miniature off-the-shelf components may be stitched directly through into fabric's conductive patterns, or by utilizing holders, sockets, or sequins that can be connected to the fabric in a variety of ways. Sequins may be stitched into conductive thread lines, and holder leads can be soldered to something like a fabric FCB, which really is a companies and users fabric that has been pre-treated. The stitching tabs contribute just a few millimeters of resistance to the circuit.

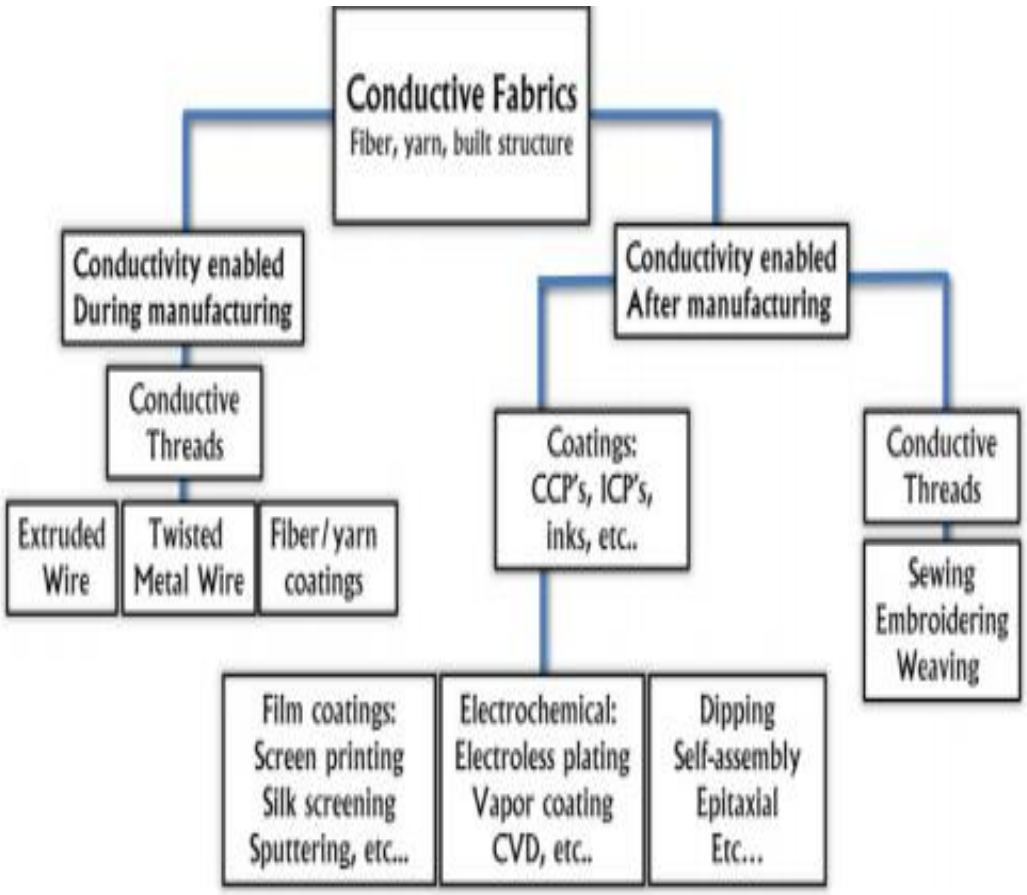

Figure 2: Techniques to enable conductivity in fabrics

Sewing thread fibers in patterns, potentially with numerous crossings, to obtain desired electrical characteristics may be used to make electronic components out of conductive thread. Numerous methods may be used to provide thread conductive characteristics before and after the thread production process, as shown by the figure 2. Each of these elements may be customized to create a circuit element with specific properties. The deposition of metal or conductive coating materials to the cloth surface is another popular method. Laminating methods, including those derived from conventional and flexible electronics, are also used.

1.6.Sensors in smart textiles

Fabric sensing ideas have been investigated in a number of capacities and for a wide range of applications. None standard fabric parts or components, on the other hand, have been identified as the most promising candidates for laying the groundwork for the sector. This section will demonstrate the most typical sensing methods found in fabric sensors using charts, figures, and summarizing tables.

1.7.Capacitive

Capacitive fabric sensors are most often used for pressure & tactile sensing. For use on textiles, a variety of patterns and materials have already been tested and prototyped. They vary from adapted electronics to inherently changed materials, but they all contain a dielectric element between two electrodes in common. E-textiles use ordinary capacitors that are connected to cloth utilizing customized techniques in adapted electronics. An adapted capacitor is usually placed on a frame that may be stitched, snapped, or glued to a fabric substrate before being connected to other devices or cables. Fabric capacitors may also be made using flexible conductive materials that serve as electrode plates and are insulated by different dielectrics and spacers[9].

1.8.Resistive

Some other method of making fabric pressure sensors is to find a relationship between pressure and electrical resistance. Integrated sensors may be made at any level of the fabric structure, including yarn, fiber, and coatings. The contact resistance of crossing conductive yarns changes as pressure is applied on a grid of intersecting embroidered conductive threads. By sensing the point where the resistances change, the location of the pressure applied to the fabric may be determined.

REVIEW OF LITERATURE

Amongst some of the numerous papers published in the area of smart fabric sensors, one titled "Smart fabric sensors and e-textile technologies: a critique" stands out. Lina M Castano and Alison B Flatau spoke about the situation. Textures are the newest silicon wafers, and they've sparked a lot of attention due to the possibility of useful devices and sensitive registration. Despite the fact that it is not a replacement for traditional hardware, this area has a market that is still in its early stages of development, since it lacks a standard set of methods or components. It became an integral part of the development of wearable technology. This article includes a review of advances required for the development of textures with combined utility, with a focus on sensor applications. Smart texture sensors (SFSs) are textures having detecting characteristics that are sensitive to a variety of physical and chemical changes, such as fluctuations in climate, pressing factor, power, and electrical current, amongst many others. At any level, detecting components may be merged into textures if the surrounding texture component is changed or sharpened[10].

Alison B Flatau studied the article offers an overview of current advances in the area of smart fabric sensor and electronic textile technology, which is constantly continuously developing. It covers the fundamental concepts and methods utilized in fabric sensor development, as well as the most frequently used materials and processes in electronic textiles. This article demonstrates how, depending on the degree of integration into the fabric platform, intrinsic and extrinsic changes to textile substrates may be used to generate sensing capabilities. Fabric sensors may be customized to detect force, pressure, chemicals, humidity, and temperature changes, according to the present research. Fabric techniques' materials, connections, fabric circuits, interconnects, encapsulation, and manufacturing techniques are more customizable and flexible than their traditional electronics equivalents. The results of this study indicate that by combining several kinds of textile-based functional components, a full smart fabric system may be created[1].

DISCUSSION

The textural pressure sensing capacitors are usually designed to match the work of art and to have a capacitance of Pico farads. The capacitive plate layers may range in thickness from microns to millimeters and can be calculated in a variety of ways depending on the intended use. Strain sensing components have a much higher maximum strain rate than conventional components and can adapt to any surface. The range of applicability for any kind of texture sensor is unmistakably determined by the motive for the application, as well as the mathematical and mechanical requirements. The affectability of such sensors will, for the most part, be determined by the composite structure's flexibility, temperature, and wetness. Other texture sensors include those with fine optic filaments that are sensitive to synthetic chemicals and gases, as well as those sensitive to environmental variations. All adaptable macro electronics advances, such as flexible presents, OLEDS, MEMS, texture photoelectric and energy collecting devices, and others, substantially complement SFTs.

CONCLUSION

The many layers of structure used in the design of texture-based sensors have been discussed, ranging from the inborn level with dynamic filaments to the outer level with discrete electrical segments connected to textures. Intrinsically conductive polymers and doped polymer matrix composites may be used to create natural detecting components. Outward detecting components, such as discrete units or coatings, may be constructed by modifying fundamental texture units to give them detecting characteristics such as optical, resistive, or capacitive, to name a few. Connectors, interconnects, and cathodes are determined by the same kind of sensor, mechanical requirements, and intended use. Every interface configuration is different and almost unique. Material hardware is possible thanks to techniques that have been tailored to textures. Ideas that combine commonplace devices with large-area hardware are critical to the development of hardware on materials. In any case, vigor is enhanced by reducing the adaptability of texture components, such as via shaping and embodying processes. Protective techniques are often confined tactics used from the textile business, but associations are frequently adapted from commonplace devices.

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SOME CONSIDERATIONS ON PUBLIC ADMINISTRATION ACTIVITIES OF ABDULLAH KHAN II

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ABSTRACT

This article highlights the political activities of Abulfath Abdullah Bahodirkhan, a talented politician, commander and statesman, based on information from historical written sources.Thelives and activities of many individuals in Mazi have been coincided with complex socio-political events. Sometimes, it is known that they were at the forefront of that serious process and change, influencing the turbulent problems and contradictions of the period, the dangerous sins and sharp turns.

KEYWORDS:*Shaybanikhan, Ubaydulla Sultan, Iskandarkhan, Movarounnahr, Science Of Hadith, Jurisprudence, SheikhsKhoja Islam.*

INTRODUCTION

The lives and activities of many individuals in Mazi have been coincided with complex socio-political events. Sometimes, it is known that they were at the forefront of that serious process and change, influencing the turbulent problems and contradictions of the period, the dangerous sins and sharp turns. Abulfath Abdullah Bahodirkhan ibn Iskandarkhan ibn Janibek sultan ibn Khojagum sultan ibn Abulhairkhan, who lived in the second half of the 16th century and was able to unite DashtiKipchak, Movarounnahr, Khorezm and Khorasan into a single state, is one of such historical figures. This article covers the political activities of Abulfath Abdullah Bahodirkhan, a talented politician and commander, statesman, creator and patron of science, based on information from historical written sources.

MATERIALS AND METHODS

Abdullah Khan II, who took advantage of the wars between the independent estates and the great nobility against them, gradually began to unite the lands of Movarounnahr and Khorasan under his rule. His actions were actively supported by the local sheikhs, Hodja Islam and his son HodjaSa'd. [Turaev, 2007: 70-75]. In 1561, Abdullah Khan II severed ties with his uncle Pirmuhammad and proclaimed his father, Alexander Sultan (1561-1583) khan. In fact, Iskandar was a khan in the name of Sultan and did not interfere in the management of the country, the power was in the hands of Abdullah Khan II. After the death of Alexander Sultan in 1583,

Abdullah Khan II was declared the official khan. [Eshov, 2012: 255]. Thus, in the second half of the 16th century, Abdullah Khan entered the political arena in the context of modern Uzbekistan in a complex historical context. Meanwhile, Hafiz Tanish Bukhari states in his work "Abdullanoma" ("Sharafnomai-shohi") that "the lands from the border of Kashgar region to Khorezm and from the border of DashtiKipchak to the foothills of Kandahar, all Movrounnahr, Khorasan, Turkestan and Khorezm)". [Bukhari, p.169]. In addition, the great orientalist W. W. Barthold said, "Abdullah II's reign was a rare event, and although he established his rule on the basis of cruelty and military force, not only the whole of Movrounnahr, rather, he was able to unite Khorasan and Khorezm and establish a strong state" [Bartold, 1963: 269], in another collection, the Muslim centralized state agreed with pure paganism [Bartold,1963:100]. Thus, in the second half of the 16th century, Movarounnahr entered the arena of political struggle and ruled the Bukhara throne for almost 41 years.

1. 1551 - 1557, the period of Abdullah Khan II's struggle for power;

2. 1557 - 1561, the struggle for the throne of the Bukhara Khanate and its conquest;

3. 1561 - 1578 - unification of Movarounnahr and centralization of power;

4. The years 1578-1595 were marked by the establishment of a centralized state in Central Asia [Sultonova, 2005:37-38].

Relying on the entire Uzbek tribes, the settled population, the Juyborkhojas and all the clergy, and all his followers, Abdullah II was promoted to khan, that is, when he was enthroned in white felt according to the old Turkic-Uzbek legal tradition, the ends of felt were as large as the customs of Turkic peoples demanded. Not the well-known chiefs of the tribes, rather, the centralization of the state, held by priests who were interested in strengthening discipline in it, meant that there were always religious scholars before it. After establishing a centralized state, Abdullah Khan conquered Badakhshan in 1584, Herat in 1588, Khorezm three times in 1593-94, and Khazarasp in 1595-96. Therefore, a strong centralized state was formed, and economic, political and political relations were re-established in all respects, from Kashgar to the Aral and Caspian coasts, from Turkestan and Sayram to the eastern part of Khorasan. At this point, if we briefly dwell on the personality of this Shaybani sultan Abdullah Khan, we will see that all the qualities of the rulers of the Middle East were embodied. He knew the history of his time as a skilled politician because he adhered to the idea of creating a centralized state. The fact that he chooses not to be harsh and shameless on this path is emphasized in the literature as the "Blood and Iron" path. [Mukimov, 2008:36-37].

There could be no other way than this one. It is true that, despite nearly two decades of struggle with its enemies in the political arena, many generations of Shaybanis perished, and many of their descendants perished during the Shaybanid state's policy of unification does not mean that the internal conflicts in the state are completely over. [Ziyo, 2001:241]. At the end of the years of his reign, the vassals of Abdullah Khan II began to strike him with treacherous blows. In particular, as a result of a sudden attack by his former ally, the Kazakh khan Tavakkal, behind treason, his troops were defeated and they invaded the property of Bukhara. In the south, Iranian troops are pushing the Uzbeks out of Khorasan. After his death, Khorezm regained its independence. His only son, Abdulmomin, was assassinated as a result of a threat-based policy that lasted only six months of his rule. [Mukimov, 2007: 79-80]. Indeed, Abdullah Khan P's policy of unification, which he pursued on the basis of strictness, is almost identical to the historical process in the political development of the countries of the world (emphasis from the author).

In this sense, the period of Abdullah Khan II's rule of the Bukhara Khanate was limited by the formation of the central state power, its success by military campaigns and the expansion of state

borders. People close to the khan were appointed to each provincial administration. It was a major success, to have the necessary economic results. In the years following Ubaydullah's death, while the khan had only a provincial status, Abdullah II became the real ruler of the whole state. [Ziyo, 2001:32]. Abdullah Khan II sought to centralize the country economically as well as politically and territorially. The minting of coins by each governor on his own behalf had a negative effect on the depreciation of the currency and domestic and foreign trade. The monetary reform carried out by Abdullah Khan II strengthened his position in the central government. In addition, special attention was paid to irrigation. Many reforms have been carried out in the fields of culture and architecture. Abdullah Khan carried out a number of reforms to regulate the affairs of state, the implementation of Sharia law, and the strengthening of law and order. In 1581, for example, he reformed the currency "because he was benevolent to the people entrusted to him by God" and After making it clear, he commanded that he be kind to the people entrusted to him by God: “Let them clean the gold without mixing anything else, and let the money be a shekel (1.37 dirhams of gold).

During this period, that is, in the 16th and 19th centuries, they used to weigh 4.8, sometimes 5 grams, and weigh 6 coins, and uproot the foundations of fraud.” [Bukhari, p.52-53] the severe punishment of those who set it shows that the legal system of that period was also well established. This monetary reform, carried out by Abdullah Khan II in public life, played a major role and had a significant impact on the development of the country's economy. According to another source, Hafiz Tanish al-Bukhari wrote that Abdullah Khan II started minting gold coins, Abdullah Khan made sure that other low-value ores were not added to the gold coin. [Akhmedov, 1999:4-5]. This means that Abdullah Khan II ordered the minting of gold coins for the development of the economy in the state, and tightened control over it so that it would not be counterfeited, thus ensuring the stability of the state. During the monetary reform carried out by Abdullah Khan II, it was ensured that the money issued in Bukhara was put into equal circulation. [Davidovich, 1951:108-113].

This not only contributed to the further centralization of state power, but also increased the socio-political significance of Bukhara. At the same time, the implementation of this policy was facilitated by the greater centralization of the state and the greater centralization of the khan's power during the reign of Abdullah II. The increase in revenues to the state treasury from minting money has helped to expand and regulate trade.

RESULTS AND DISCUSSIONS

Abdullah Khan II was a skilled politician, a brave soldier, a head of state who built at his own expense many social structures, 1001 rabots and cisterns (closed reservoirs) (this will be discussed in the next separate paragraphs). His whole life was spent on the battlefields for the establishment of this centralized state, and Hafiz Tanish's "SharofnomaiShahiy" can rightly be called "Abdullah's War". The idea of a centralized state has become part of universal values and has been valued in political history. Therefore, his work in this area is positive, but in the way of achieving this, we can be sure that he chose the path of "Blood and Iron". In the ninth chapter of Abulgazi'sShajarai Turk, we find reliable information about Khiva-Bukhara relations, Abdullah Khan's three trips to this state and its consequences. [Abulgazi, 1992:154]. He was an educated man, and according to H. Nisari, he wrote poems in Uzbek and Persian under the pseudonym "Honiy". [Niori, 1992:45]. The poetic letter of Abdullah Khan II to the governor of Samarkand Juvonmardalikhan, written in Persian, is given in SiddiqhonHashmat'stazkira book "NomaiKhisravoniy": In this world, the dream of the "Khan" is always to go to the tomb of Shahizinda and become a slave. [Kattaev, 2003:27]. In the middle of the 16th century, during the reign of the Shaybanis, especially Abdullah Khan II, ambassadors often came and exchanged letters in order to establish diplomatic and trade relations with Russia, India, Turkey and Kashgar. In particular, when Abdullah Khan II was in Zaamin (Ikar reserve) in 1578, an “envoy

sent by Jalaliddin Muhammad Akbar, the king of India," came to him and discussed the question of defining the spheres of interaction in Khorasan and Iran. [Bukhari, 2000:119-120]. Especially during this period, after the annexation of the Kazan and Astrakhan khanates to the Moscow state, it became possible to establish direct contacts with Russia. In 1557, ambassadors were sent from Khiva and Bukhara to Russia to facilitate trade. The fact that in 1558 Jenkinson came to Bukhara as an ambassador of the Russian tsar Ivan IV, and during the reign of Abdullah in 1583 ambassadors came to the khan with valuable gifts and greetings shows that the relations of cooperation did not stop.

In general, the study revealed that by 1600, five ambassadors from Bukhara and twice from Khiva had visited Moscow, mainly to discuss trade. We can also see that there were regular exchanges of ambassadors between the Shaybanid state and Kashgar, including during the second period of Abdullah Khan, ambassadors headed by DostMirzoMirzoChuhra agha visited Kashgar.

CONCLUSION

Examining the life and work of Abdullah Khan II, who ruled the Uzbek statehood for a hundred years during the Shaybanid dynasty, we can summarize:

First of all, only Abdullah II, after our ancestor Amir Temur, had the honor and happiness to unite the whole country of Turkestan around a single flag, a single capital. This was directly achieved by his skillful and courageous military leadership, prudent policy, wisdom, skillful diplomacy, which raised the country's economy on the basis of the development of irrigated agriculture and handicrafts.

Secondly, although Abdullah II spent his life on horseback, in the heat of battle, he remained in the memory of our people, in our history, as an economic, cultural, in particular, patron of architecture, a great statesman and diplomat. That is, most of the 16th-century architectural monuments in Central Asia today were built during the reign of Abdullah II, and their number exceeds 1,000. These facilities, in particular, the construction of indoor markets and stalls (ToqiZargaron, ToqiSarrafon, ToqiKitabfurushon, etc.), hotels, baths [20. A.Sagdullaev, B.Aminov, U.Mavlanov, N.Norkulov, 2000-171], have improved trade, The Ottoman Turkish state, the Baburis of India, and the khanates of East Turkestan, in particular, sought to improve trade relations with Russia, thereby trying to strengthen the political position of their state.

Thirdly, Abdullah II is the only person after Amir Temur who was able to pursue a strict policy. In the second half of the 16th century, in Movarounnahr, Khorezm and Khorasan, ending the political turmoil and the struggle for the throne, the establishment of peace in the country and the unification of power under a single center allowed the khanate to improve various areas of production, such as textiles, architecture and ceramics.

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ON SOME AWARDS AND INCENTIVES IMPLEMENTED IN UZBEKISTAN(1917-1991)

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ABSTRACT

The scientific article deals with the application of award symbols established during the Soviet era to the Uzbek SSR, as well as the history of awarding traditions in the Soviet years on the example of Fergana region. In particular, on the basis of the documents of the State Archives of Fergana region, it was reflected that each profession was gradually awarded. Also, a comparative analysis of the awarding of mothers with many children with orders and medals of various levels, the awarding of the honorary title of "Mother Heroine" and the development of appropriate recommendations.

KEYWORDS: *Award, Fergana Regional State Archive, Uzbek SSR, Supreme Soviet Presidium, Order, Medal, Honorary Title "Hero Mother", Orders And Medals Of The Soviet Government, Fund, Mothers With Many Children, Phalleristics.*

INTRODUCTION

If we look at the history of the reward system in Uzbekistan during the period from the establishment of Soviet power to independence (republics of the RSFSR (BSSR, XXSR, TASSR, 1917-1924; UzSSR within the USSR, 1924-1991)) Of course, the improvement of the reward system has played an important role in the development of each sector on the basis of a single dominant ideology - the communist idea.

It should be noted that the analysis of archival sources obtained during the study shows that the orders and medals created during the Soviet era, including the reward system, served the ideology of this historical period, the socio-political life of society, the interests of the socialist system.

The main findings and results

During the historical period from 1918 to 1991, 21 orders and 54 medals, 4 high-level and 15 honorary titles were established, which formed the basis of Soviet awards. The tradition of awarding honorary weapons and flags and awards is also widespread.

The Soviet-era reward system was first defined in legal documents and became an important part of the state ideology. In particular, Article 121 of the USSR Constitution delegates the right to

establish and present USSR orders and medals to the Presidium of the Supreme Soviet of the USSR (Presidium of the Supreme Soviet of the USSR) [1, 30]. Each order has its own level, and the Statute of the medal has been developed and established. These documents reflect the content of the award, the award, the order of wearing, privileges and other legal aspects. State awards were awarded to citizens of the Soviet Union, organizations, cities, regions, republics, as well as non-citizens of the Union.

In May 1936, the USSR MIQ and HSQ Resolution established the Document "General Rules on Orders of the USSR" (Общее положение об орденах СССР) [52]. This document was in force until 1979, and then in 1979 was adopted the Regulation "On the general rules of orders, medals and honorary titles of the USSR" (General position on orders, medals and honorary titles of the USSR). According to the Charter, "Soviet-era awards established in the first five years of the Civil War, the Great Patriotic War, as well as in the years of economic recovery and development symbolize the history of the Soviet state, the undeniable heroism and honorable work of various categories of the Soviet era." [53]. Beginning in 1938, a special order document was also issued to those awarded the order. Prior to that, the winners were awarded certificates of honor. The rules of wearing orders and medals were approved on March 28, 1980 by the Decree of the Presidium of the Supreme Soviet of the USSR.

As a result of the analysis of the documents related to this award system, it should be noted that the following state awards were in force during the Soviet era:

High-level honorary titles and badges:

1. The title of Hero of the Soviet Union (Hero of the Soviet Union), founded in 1934;

2. The title of Hero of Socialist Labor (Geroya Sotsialisticheskogo Truda), founded in 1938;

3. The title of "Hero City" (Gorod-Geroy), the title of "Kahramoni Qala" (Fortress-Hero), founded in 1965;

4. The title of "Mother Heroine" (Mat-Geroinya), founded in 1944.

In addition, a number of orders were established for heroism of the revolution, long service, protection of the socialist homeland, development of cooperation and friendship between peoples, strengthening peace and other services to the Soviet state and society:

1. The highest award of the USSR - the Order of Lenin (Order of Lenin), founded in 1930;

2. Order of the October Revolution (Order of Oktyabrskoy Revolyutsii), founded in 1967;

3. Order of the Red Banner of Labor (Order of Trudovogo Krasnogo Znameni), established in 1928;

4. Order of Friendship of Peoples (Order of Druzhby Narodov), established in 1972;

5. Order of the Badge of Honor (Order Znak Pocheta), established in 1935, after 1988 the name was changed to the Order of Honor (Honorary, Order Pocheta);

6. Order of Personal Courage ("Za lichnoe mujestvo"), established in 1988;

7. Order of Labor Glory (Order Trudovoy Slavy) 1st, 2nd, 3rd degree, established in 1974.

He was also awarded the following orders for his services in the defense of the socialist homeland and other military services:

1. Higher Military Award - Order of Victory (Pobeda), established in 1943;

2. Order of the Red Banner (Krasnogo Znameni), established in 1918, 1924;

3. Order of Suvorov 1st, 2nd, 3rd degree, established in 1942;

4. Order of Ushakov 1st and 2nd degree, established in 1944;

5. Kutuzov Order of the 1st, 2nd, 3rd degree, established in 1942, 1943;

6. Nakhimov Order of the 1st and 2nd degree, established in 1944;

7. Order of Bogdan Khmelnitsky 1st, 2nd, 3rd degree, established in 1943;

8. Order of Alexander Nevsky, founded in 1942;

9. Orders of the Patriotic War (Otechestvennoy voyny) 1st and 2nd degree, established in 1942;

10. Order of the Red Star (Krasnoy Zvezdy), founded in 1930;

11. Order of the 1st, 2nd, 3rd degree for services to the Fatherland in the Armed Forces of the USSR (Za slujbu Rodine v Voorujennykh Silax USSR), established in 1974;

12. Order of Glory (Slavy) 1st, 2nd, 3rd degree, founded in 1943;

Also to mothers for giving birth and raising at least 10-12 children in a family during the Soviet era:

1. Order of the Mother of Heroes (Mat-Geroinya), founded in 1944;

2. Order of Motherhood Glory (Materinskaya slava) 1st, 2nd, 3rd degree, established in 1944.

In the study of the subject is kept in the State Archives of Fergana region: 1124 fund - the Executive Committee of the Fergana Regional Council of Workers' Deputies. Council of People's Deputies (Executive Committee of the Fergana Regional Council of People's Deputies since 1978. Council of People's Deputies);

Fund 8 - Executive Committee of the Fergana City Council of Workers' Peasants and Deputies of the Red Army. Council of People's Deputies (Executive Committee of the Fergana City Council of Workers' and Krasnoyarsk Deputies since 1978. Council of People's Deputies);

Fund 731 - the Fergana Regional Council of the Society of Inventors and Rationalizers of Uzbekistan (Fergana Regional Council of the Uzbek Republican Council of Inventors and Rationalizers). The following volumes have been analyzed and new data that have not yet been studied have been put into scientific circulation and proved:

Decrees of the Presidium of the Supreme Soviet of the USSR on awarding orders and medals of the Presidium of the Supreme Soviet of the USSR to the heads of agriculture of the Uzbek SSR (1984);

Decrees of the Presidium of the Supreme Soviet of the USSR on the awarding of orders and medals of the USSR to the heads and workers of all branches of the Fergana region

Decrees of the Presidium of the Supreme Soviet of the USSR on the awarding of medals of the USSR (Decree of the Presidium of the Supreme Soviet of the USSR on the awarding of medals of the USSR) (1959-1964);

Decrees of the Presidium of the Supreme Soviet of the Uzbek SSR on the awarding of honorary diplomas to employees of all branches of the Fergana region*;*

Decrees of the Presidium of the Supreme Soviet of the USSR on conferring the honorary title of "Hero-Mother"

Decrees of the Presidium of the Supreme Soviet of the Uzbek SSR onawarding medals "Motherhood Glory" and "Motherhood Medal" in the districts of Fergana region

Decrees of the Presidium of the Supreme Soviet of the Uzbek SSR on awarding orders and medals to mothers with many children

Book of registration of orders and medals of the Supreme Soviet of the USSR (Kniga ucheta ordenov i medaley Verkhovnogo Soveta SSSR) (1950-1951);

Resolution of the Executive Committee on the awarding of medals "Veteran of Labor" (1968-1970, 1984, 1988);

List of recipients of the medal "30 years of victory in the Great Patriotic War of 1941-1945" (List of awarded medals "30 years of Victory in the Great Patriotic War of 1941-1945" (1975-1977);

Documents on awarding jubilee medals "40 years of victory in the Great Patriotic War" (Документыпонаграждениюу Jubilee medals "40 years of victory in the Great Patriotic War") (1985-1987);

Act on awarding medals "For glorious labor" in the Great Patriotic War of 1941-1945 in the districts of Fergana region (Act of awarding medals "For double labor" in the Great Patriotic War of 1941-1945 in the Fergana region)

During the period under study in all regions of the Uzbek SSR (Andijan, Bukhara, Jizzakh, Kashkadarya, Namangan, Samarkand, Syrdarya, Surkhandarya, Tashkent, Fergana, Khorezm regions, Tashkent and Karakalpak ASSR) a system of rewards was established. Implemented by Decrees and Resolutions of the Presidium of the Council. Awards with them are held regularly every month of the year:

Orders - Lenin, Red Banner (Krasnogo Znameni), 1st and 2nd degree Patriotic War (Otechestvennoy voynы 1, 2nd degree), Labor Red Flag (Trudovogo Krasnogo Znameni), Red Star (Krasnoy Zvezdы), Badge of Honor (Znak pocheta), Hero mother (Mat heroine) and Motherhood fame (Materinskaya slava);

Medals - "Sickle and hammer" (Serp i molot), "For Courage" (Za otvagu), "For Combat Services" (Za boevye zaslugi), "For glorious labor" (For labor doubles), "For example in labor" ”(Za trudovoe otlichie) and“ Onalik medali ”(Medal materinstva).

Also, among the documents confirming the winners were presented the Book of Heroes, the Book of Heroes, the Book of Orders and the Certificates of Medals. [2, 2].

In the Uzbek SSR and other allied republics, people awarded the 3rd degree "Hero of the Soviet Union", "Hero of Socialist Labor" and "Order of Glory" were provided with coupons, letterheads and created opportunities in a number of areas. For example, free tickets and tickets for rail, water, air or long-distance road transport, as well as intra-city transport and inter-district bus routes are provided. These opportunities were valid for 5 years [3, 19-20].

As a result of the analysis of archival data, the tradition of awarding the Order of Motherhood Glory and the Medal of Motherhood was widely practiced in all regions of the Uzbek SSR. Only at the meeting of the Presidium of the Supreme Soviet of the Soviet Socialist Republic of Uzbekistan in 1946, the Presidium of the Supreme Soviet of the CCCR on July 8, 1944 The report on the implementation of the Decree "On the establishment of the Order of Motherhood Glory and the Medal of Motherhood" [4, 9]. According to him, from 1944 to 1946, 153 mothers in the Uzbek SSR were awarded the honorary title of "Heroic Mother", 5300 were awarded the

Order of "Motherhood Glory", more than 16 thousand people were awarded the "Medal of Motherhood" [4, 10-11].

Or, according to the report of July 1, 1964, the number of mothers with many children awarded orders and medals in the territory of the Uzbek SSR was 54058, including 7127 - Andijan (agriculture), 1331 - Andijan (industry), 3922 - Bukhara, 4514 - Kashkadarya, 8183 - Samarkand, 3819 - Surkhandarya, 3608 - Syrdarya, 5840 - Tashkent (agriculture), 884 - Tashkent (industry), 5869 - Fergana (agriculture), 966 - Fergana (industry), 3103 - Khorezm, 1957 - Tashkent city executive committee, 2935 - Karakalpak ASSR [5, 125].

By the Decree of the Presidium of the Supreme Soviet of the USSR on May 24, 1979 361 people from all over the territory of the Uzbek SSR [6, 2-22], on December 6, 1979 649 people [6, 163-181], on December 7, 1979 280 people [6, 300- 316], on December 19, 1979, 304 [6, 282-299] mothers of many children were awarded the Order of the Hero Mother and honorary orders.

In Fergana region, as in all other regions, the awarding of orders and medals to mothers of many children has been held annually and on time since the establishment of the award [5, 123]. For example, below we will try to cite the statistical calculations of the winners on the basis of data stored in the State Archives of Fergana region, although not every year, but every month.

In particular, by the Decree of the Presidium of the Supreme Soviet of the USSR of August 7, 1954, 24 people were awarded the Order of "Motherhood Glory" (hereinafter the Order), 96 people were awarded the Medal of Motherhood (hereinafter the medal) [7, 3]. 198 with the Order of December, 953 with the medal [8, 48], 56 with the Order of 17 August 1963, 243 with the medal [9, 89], 101 with the Order of March 30, 1963, 378 with medals [9, 184], 35 with orders by the Decree of October 5, 1964, 112 with medals [5, 86], 410 with orders with the Decree of March 28, 1966, 1062 with medals [10, 1], 332 with the Order of September 9, 1966, 925 with the medal [11, 2], 326 with the Order with the Decree of October 21, 1966, 899 with the medal [11, 199-200], December 31, 1966 35 with the Order, 119 with the medal [12, 2], 436 with the Order with the Decree of March 24, 1967 1019 people with medals [13, 3], 450 people with medals by the Decree of May 31, 1967, 1050 people with medals [13, 1-2], 429 people with medals by the Decree of September 21, 1967, 1065 people with medals [14, 1-2], 429 with the Order by the Decree of January 30, 1968, 904 with the medal [15, 2], 345 with the Order by the Decree of November 1, 1968, 824 with the medal [16, 2], By the Decree of January 31, 1969, 369 people were awarded orders, 819 people were awarded medals [5, 2], 530 people were awarded medals by the Decree of August 15, 1969, 992 people were awarded medals [18, 1-2], by the Decree of May 21, 1969 601 with orders, 1272 with medals [19, 1-2], 485 with orders by the decree of November 4, 1969, 1049 with medals [20, 1-2], 574 with orders by the decree of May 13, 1970 , 1184 with medals [21, 2], 526 with orders by decree of June 26, 1970, 995 with medals [22, 1-2], 504 with the Order of October 7, 1970, 973 with the medal [23, 1-2], 644 with the Order of February 23, 1973, 904 with the medal [24, 2], with the Decree of September 27, 1973 379 orders, 602 medals [25, 1-2], 537 orders on the basis of the Decree of October 26, 1973, 767 medals [25, 100], 306 orders on the basis of the Decree of November 28, 1980, 638 with medals [26, 2], with 195 orders under the Decree of March 31, 1982, with 478 medals [27, 1-2], with the Order of January 31, 1986 with 118 orders, with 442 medals [28, 1] mothers with many children were awarded. In the first half of 1985, Fergana region awarded 2,097 awards,

including 47 honorary titles "Heroic Mother", 2,050 orders "Motherhood Glory" and "Motherhood Medal" [29, 2].

During the analysis of archival documents, we were convinced that the Order of "Glory of Motherhood" and the "Medal of Motherhood" were divided into different levels, which were also presented as follows:

- For mothers with 10 or more children - the honorary title of "Heroic Mother";

- To mothers with 9 children - the order "Glory of motherhood" of the 1st degree;

- To mothers with 8 children - the order "Glory of motherhood" of the 2nd degree;

- To mothers with 7 children - the order "Glory of motherhood" of the 3rd degree;

- To mothers with 6 children - the medal "Motherhood" of the 1st degree;

- For mothers with 5 children - Medal "Motherhood" of the 2nd degree [21, 6-8].

As a result of the above statistics and the study of additional archival materials, it can be said that in all regions of the country, including Fergana region, the rate of awarding orders and medals to mothers with many children has increased from year to year. For example, in the Fergana region, the number of mothers with many children awarded orders and medals was 15,818 in 1967, 17,057 in 1968, and 19,037 in 1969 [30, 19-20]. In the period from 1957 to 1969 in the Fergana region, the honorary title of "Heroic Mother" was awarded to 973 mothers with many children [30, 19].

In the Uzbek SSR, the heads of Soviet bodies, enterprises and organizations, as well as the public, have taken great care of mothers with many children, in addition to state benefits, to provide them with financial assistance. For example, the Standing Committees of the Health and Welfare Councils, together with the staff of the Women's Councils, pay close attention to the study of housing conditions, the medical examination of mothers with many children and the health of children by health workers. Many were assisted in home renovations, new housing allocations, and fuel supply. Children of mothers with many children are primarily provided with boarding schools and kindergartens. In cities, collective farms, and state farms, the dairy kitchen was open free of charge to children.

During the Soviet years, the issue of employment of mothers with many children in Uzbekistan, the creation of all economic conditions for them was also under control. For example, according to the archives, L.Abdullaeva, the owner of the title "Hero Mother" with ten children, worked in the Fergana windmill factory and organized a public campaign in the women's council of the factory to promote communist ideology [30, 93].

Also in Kokand, H. Abdurahmanova was the mother of eleven children, as well as the secretary of the mahalla committee and worked on a community basis. Thanks to his active propaganda work, the residents of the mahalla collected 7 tons of raw cotton in the 1970 season and achieved a significant result.

A.Sultanova, who lives in Leningrad district, is also a mother of eight children, has worked as a school teacher for a long time and has achieved high results in the preparation of silkworms and cocoons. He was awarded the State Prize for the introduction of high-performance silkworm rearing, and the title of "Hero of Socialist Labor" for high yields of cocoons. He even served as a member of the Third All-Union Congress of Collective Farmers in Moscow [30, 94].

It can be said that hundreds of such "Heroic Mothers" have been found in the Uzbek SSR, among them many doctors, teachers, cotton growers, cattle breeders and other specialists of the national

economy. Mothers of many children worked as deputies of regional, city, district, village and township councils, and actively participated in the activities of standing committees and public amateur organizations of workers.

- It should be noted that in the study of the reward system of the Uzbek SSR in the Soviet years, the role of the USSR state awards, certificates of honor is invaluable. In particular, by the Decrees and Resolutions of the Presidium of the Supreme Soviet of the USSR, awarding events were held in the allied republics, including the Uzbek SSR, in the political, socio-economic and cultural spheres.
- In the Soviet years, the recipients of the USSR state awards received their awards in a solemn manner on the days of their professional holiday. For example, employees of the chemical industry were awarded on "Chemists' Day", railway transport workers on "Railwaymen's Day", workers of construction companies on "Builders' Day", traders on "Merchants' Day" [31, 2].
- For example, on the basis of the Decree of the Presidium of the Supreme Soviet of the USSR of February 12, 1948, on September 1 of each year, public educators, leaders, teachers were awarded USSR state awards for many years of service and selfless work. In particular, based on the level of his long-term work, the following awards were presented:

- 10-14 years of work - the medal "For exemplary work";
- 15-19 years of work - the medal "For Shavkatli Mehnati";
- 20-24 years of work - the order "Badge of Honor";
- 25-29 years of work - the order "Red Banner of Labor";
- 30 and more works - awarded the Order of Lenin [32, 6-10].

Also, in accordance with the Decree of the Presidium of the Supreme Soviet of the USSR of October 23, 1978, 92 health and medical workers in the Uzbek SSR were awarded USSR state awards ("Red Banner of Labor", "Badge of Honor" and "For Exemplary Labor" and "For Meritorious Labor". ”Medal) [33. 107-110].

Also, in accordance with the Decree of the Presidium of June 6, 1984, more than 300 agricultural leaders in the Uzbek SSR received state awards of the USSR ("Lenin", "October Revolution", "Red Banner of Labor", "Badge of Honor", "Friendship of Peoples", "Labor"). He was awarded the Order of "Glory" and the medal "For Meritorious Labor", "For Exemplary Labor" [34, 101-115].

Consequently, the awarding of state badges of the USSR was carried out in a solemn manner on a large scale in all regions of Uzbekistan. Analyzing the example of Fergana region among the regions of the republic, we come across lists of awards through a lot of statistics in the archives. For example, in the Fergana region, pickers who achieved good results in the socialist competition in the 1955 cotton harvest and set a special example were awarded certificates of honor of the Supreme Soviet of the Uzbek SSR. For example, Buvayda - 48, Akhunboboev - 16, Baghdad - 13, Fergana city - 3, Kirov - 12, Kaganovich - 2, Kuva - 10, Vodil - 1, Quybishev - 4, Toshloq - 11, Polotov - 19, Yazyavon - 9 , Altiyarik - 7, Frunze district - 27 representatives were awarded [35, 2-3].

Also, by the Decree of the Presidium of the Supreme Soviet of the USSR of August 30, 1960, 2 residents of Fergana region were awarded the Order of Lenin, 15 the Order of the Red Banner of Labor, 25 the Order of the Badge of Honor, 64 the Medal for Shavkatli Mehnati [36, 16].

By the Decree of March 1, 1965, 1186 award badges were sent to the Fergana region and handed over to their owners. In particular, 39 people were awarded the Order of Lenin, 136 the Order of

the Red Banner of Labor, 295 the Order of the Badge of Honor, 384 the Medal for Shavkatli Mehnati, and 332 the Medal for Exemplary Labor [37, 6]. The decree also includes a list of honorary titles: 43 "Honored Cotton Grower", 7 "Honored Agronomist", 3 "Honored Cattleman", 5 "Honored Irrigator", 17 people "Honored" mechanist ", 2 people were awarded the honorary title of" Honored basement worker "[37, 6].

By the Decrees of the Presidium of the Supreme Soviet of the USSR of December 31, 1966 and January 14, 1967, a group of our compatriots received a number of state awards of the USSR. In particular, "Lenin" - 1 person, "Red Banner of Labor" - 1 person, 3 people with the Order "Badge of Honor", 2 people with the medal "For Shavkatli Mehnati", 5 people with the medal "For Exemplary Labor" [38, 17], by the Decree of February 13, 1967, 44 people, including "Lenin" - 2 people, "Red Banner of Labor" - 4 people, 14 people with the Order "Badge of Honor", 11 people with the medal "For Glorious Labor", " 13 people with the medal "For exemplary work" [38, 1-3], 2741 people from Fergana region according to the Decree of August 12, 1971, including the title of "Hero of Socialist Labor" - 13 people, "Lenin" - 99 people, "October Revolution "- 129 people," Red Banner of Labor "- 704 people, 851 people with the" Badge of Honor "orders, 408 people with the" For Meritorious Labor "medal, 550 people with the" For Exemplary Labor "medal [31, 1-2], In accordance with the Decree of December 14, 1972, "Lenin" - 43 people, "Red Banner of Labor" - 447 people, "Badge of Honor" - 382 people, "Shavkatli Mehnati Uchun" medal - 199 people, "Mehnatda Orn Konsatgani" medal - 212 people. [39, 1-6], according to the Decree of December 25, 1976, 1449 people, including "Lenin" - 34 people, "October Revolution" - 61 people, "Red Banner of Labor" - 217 people, "Badge of Honor" - 288 "Labor Glory" 2nd degree - 11 people, "Labor Glory" 3rd level - 356 people, as well as 247 people with the medal "For Meritorious Labor", 245 people with the medal "For Exemplary Labor" [40, 285], In accordance with the Decree of May 30, 1977 and June 1-10, 42 people from Fergana region, including "October Revolution" - 1 person, "Red Banner of Labor" - 8 people, "Badge of Honor" - 13 people, "Labor Glory" - 3 levels - 8 people, as well as 7 people with the medal "For Meritorious Labor", 5 people with the medal "For Exemplary Labor" [41, 56], 1977 In accordance with the Decree of May 17-30, 140 people were awarded "Lenin" - 2 people, "October Revolution" - 2 people, "Red Banner of Labor" - 29 people, "Badge of Honor" - 31 people, "Labor Glory" for services in the field of agriculture. Level 3 - 24 people, as well as 26 people with the medal "For Shavkatli Mehnati", 26 people with the medal "For exemplary work" [41, 57], 267 people from Fergana region in accordance with the Decree of May 12-18, 1977, including Lenin "- 1 person," October Revolution "- 2 people," Red Banner of Labor "- 45 people," Badge of Honor "- 67 people," Labor Glory "level 3 - 53 people, as well as with the medal" For Glorious Labor " 51 people were awarded the medal "For example in labor" and 48 people were awarded [41, 58].

In accordance with the Decree of the Presidium of the Supreme Soviet of the USSR of January 18, 1974 "On the establishment of the medal" Labor Veteran "in Fergana region, 728 people were awarded the medal" Veteran of Labor "by the Executive Committee of People's Deputies of Fergana region. In particular, 104 people from Fergana, 232 from Quvasoy, 23 from Margilan, 123 from Toshloqsay, 83 from Oltiariq, 100 from Kirguli and 63 from Fergana districts were awarded this medal [42, 1-3]. In 1988, 1,731 people were awarded this medal [43, 1].

By the Decree of the Presidium of the Supreme Soviet of the USSR dated December 14, 1972, the First Secretary of the Fergana Regional Committee of the Communist Party of Uzbekistan Shamsudinov Fahriddin Shamsudinovich was awarded the title of "Hero of Socialist Labor", the Order of Lenin and the Gold Medal "Sickle and Hammer" [38, 92]. H.Arzikulova, F.Artikova, U.Bekniyozov, E.Jumaev, H.Ishonov, N.Komarov, M.Marahimov, K.Mirzaev, U.Nurullaev, A.Rakhmonov, S.Sidikov, S Tairov, Z. Tasheva, A. Khudaiberganov were also awarded [38, 94-95]. In 1967, by the decision of the Executive Committee of the Fergana region of Workers'

Deputies, 54 people were awarded the medal "For saving the drowning" for bravery and courage in saving lives, in times of chronic drought [3, 1-3].

During the Soviet era, state award badges were also presented to cities and districts. For example, in 1967 a ceremony of awarding the Order of Lenin was held at the Lenin collective farm in the Pop district of Fergana region. The fact that the Order of Lenin was the most inspiring symbol of the aspirations for the victory of communism at that time, as well as a beacon of new victories in the party leadership, was applauded by individuals and organizations who sincerely served and believed in the Soviet state system [3, 50].

This can be explained by the fact that in Uzbekistan during this period, a lot of attention was paid to the system of rewards, including the awarding of small businesses. For example, on May 22, 1971, the Presidium of the Supreme Soviet of the Uzbek SSR appointed a number of Fergana residents who contributed to the production and development of rabbit breeding, meat and skin - M. Ibragimova, U. Iminova, A. Mahmudov, S. Mirzaev, N. Mikhailov, I. .Sarmanov, B.Esonmirzaev were awarded with honorary diplomas [44, 157].

The tradition of commemorating and celebrating the 10th, 20th, 30th and 40th anniversaries after the victory in World War II was widespread in the Soviet Union, including Uzbekistan. In this regard, jubilee, commemorative and commemorative medals established by the Supreme Soviet of the USSR in honor of the great victory were awarded to all regions of Uzbekistan.

For example, on the basis of the task assigned to the Presidium of the Supreme Soviet of the USSR, in 1965, 400 medals "20 years of victory in the Great Patriotic War of 1941-1945" were sent to Fergana region. The medal was awarded to former partisans, as well as to those who received the medal "For Victory over Germany in the Great Patriotic War of 1941-1945" and a number of others who served in the USSR military and set an example behind the front [38, 37-38]. Also, in 1965, 53 people from Margilan [38, 39], 700 people from Quvasoy [38, 40], 1800 people from Kirov [38, 41], 2269 people from Leningrad [38, 42], 1901 people from Uzbekistan district [38, 43]. The proposal and the list to award the medal "20th anniversary of the victory in the Great Patriotic War of 1941-1945" were sent to the Supreme Soviet of the USSR and preserved in archival documents. As a result of the analysis of archival data, it should be noted that in 1967 alone, 900 medals were sent to Fergana region entitled "20th anniversary of the victory in the Great Patriotic War of 1941-1945." Of these, 780 were presented to their owners and the rest were stored in the prize warehouse [38, 24].

In 1975-1977, 1292 people from Fergana region were awarded the commemorative medal dedicated to the 30th anniversary of the victory in the Great Patriotic War of 1941-1945. The medal bears the inscription "Participant of the Labor Front" [45, 1]. A large amount of this medal was sent to the population of Kokand, which numbered 801 [45, 179].

In 1985-1987, a commemorative medal dedicated to the 40th anniversary of the victory in the Great Patriotic War of 1941-1945 was established [46, 1]. with medals "For Victory over Germany in the Great Patriotic War" and "For Victory over Japan", as well as orders of the USSR during the Great Patriotic War and medals for "heroic work in the Great Patriotic War of 1941-1945" in defense of cities. presented to awarded front and frontline workers [47, 132]. The medals were presented with the inscription "War veteran" or "Labor front participant".

According to the archives, in 1986, a total of 870 medals were requested in Fergana region, 70 of which were awarded to registered residents. [47, 114,120].

In addition, all regions of Uzbekistan, such as the Allied republics, were awarded medals and other awards "For the victory over Germany in the Great Patriotic War of 1941-1945" [38, 27]. For example, in all regions of Uzbekistan, the people who contributed to the victory in World War II and worked hard were awarded the medal "For valorous work in the Great Patriotic War of 1941-1945" (For hard work in the Great Patriotic War of 1941-1945). In a letter from A. Muminov, Chairman of the Presidium of the Supreme Soviet of the USSR, to B. Usmonkhodjaev, Chairman of the Executive Committee of the Fergana Regional Soviet of Workers' Deputies, in 1946, [48, 5] meant that there was a serious focus on rewarding events.

The life and work of each recipient of state awards in the territory of Uzbekistan and the process of awarding are widely covered on radio and television, as well as in the press, newspapers ("Fergana Haqiqati", "Kommuna" in Fergana region) [31, 2] .

The Resolution of the Presidium of the Supreme Soviet of the Soviet Socialist Republic of Uzbekistan was published on September 16, 1986 "On the order of publication of materials on the awarding of state awards" [47, 24-25]. According to it, on behalf of the Presidium of the Supreme Soviet of the USSR to award the Presidium of the Supreme Soviet of the Uzbek SSR with medals "For special services in maintaining public order", "For rescuing the drowning", "For courage in fire" and "Motherhood Glory" and "Motherhood Medal" Decrees of the Presidium of the Supreme Soviet of the Uzbek SSR, as well as enterprises, associations, institutions, organizations, state farms, collective farms, creative teams, military units (units, associations, unions and military educational institutions), regions, districts, cities, villages, auls, separate Decrees on awarding individuals or groups of workers with honorary diplomas of the Presidium of the Supreme Soviet of the Uzbek SSR and decrees on awarding honorary titles to citizens and creative communities of Uzbekistan will be published in the Bulletin of the Supreme Soviet of the Uzbek SSR and republican newspapers. (“Vedomostyax Verkhovnogo Soveta Uzbekskoy SSR”).

Reports on awarding mothers with many children with the medals "Motherhood Glory" (in the form of a list of winners) and "Medal of Motherhood" (in the form of an annual) will be published in city and district newspapers under the headings "Presidium of the Supreme Soviet of the Uzbek SSR".

Decrees of the Presidium of the Supreme Soviet of the Uzbek SSR on awarding honorary titles of the Uzbek SSR and awarding individual citizens or groups of workers with honorary diplomas of the Presidium of the Supreme Soviet of the Uzbek SSR are usually published in republican newspapers in the form of chronicles or lists.

CONCLUSION

Announcements of awarding citizens with the medal "Veteran of Labor" were published in local newspapers in the form of a short chronicle, and the decrees were published in full in the labor collectives where the awardees work.

In conclusion, a lot of new information was obtained on the topic of research based on archival sources, and a number of scientific results were obtained. In particular, new, not yet scientifically circulated historical and statistical data were identified and compared using archival data. This is explained by the fact that the awards, established during the Soviet era, have been implemented in Uzbekistan, including in the Fergana region, where a large part of the population of the valley, especially the "Heroic Mothers" came from and were awarded. Also, the status of implementation of state award symbols was studied chronologically. Along with a number of achievements, it was determined that a number of tasks needed to be accomplished:

- Consolidation of a special fund in the State Archives of Fergana region called the system of rewards in the regions of the Uzbek SSR;

- Creation of an illustrative manual "Tradition of awards of the Uzbek SSR (in the regions)", which distinguishes the awards of the Soviet era, the honorary title "Hero-Mother" and other awards;

- Opening a separate section in the existing large museums of Fergana region, dedicated to the awards won by the residents of Fergana region;

- Study and scientific circulation of award documents in the archives of foreign countries (Russian Federation, CIS) in the funds belonging to the Uzbek SSR;

- Development of a more detailed study of the system of rewards and historical research in the Uzbek SSR in the Soviet years (based on regional studies).

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A DISCUSSION OF DIABETES, ANTIOXIDANTS AND OXIDATIVE STRESS

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ABSTRACT

Oxidative stress seems to have a significant role in the development of both forms of diabetes mellitus, according to a growing body of data from both potential therapeutic investigations. In diabetes, glucose oxidation, non-enzymatic glycation of proteins, and subsequent oxidative breakdown of fasting blood glucose proteins produce a disproportionate amount of free radicals. Damage to cellular organelles and processes, oxidative stress, and the development of metabolic syndrome may all result from abnormally high amounts of free radicals and a concurrent decrease in antioxidant defense systems. Those oxidative stress effects may contribute to the growth of diabetic complications. This review discusses changes in oxidative stress biomarkers such as superoxide dismutase, catalase, glutathione reductase, glutathione peroxidase, glutathione levels, vitamin supplements, lipid peroxidation, nitrite intensity, non-enzymatic glycosylated proteins, and hyperglycemia in diabetes, as well as their implications. The impacts of various conventional and alternative medicines upon those biomarkers are investigated in vivo. In order to broaden therapeutic approaches, more research is needed on the link involving free radicals, diabetes, and its complications, as well as the processes through which enhanced oxidative stress promotes the development of diabetic problems.

KEYWORDS:*Antioxidants, Catalase, Type 1 Diabetes Mellitus, Glutathione Peroxidase, And Oxidative Stress.*

1. INTRODUCTION

Diabetes mellitus is a complex disease high blood glucose levels and insufficient endogenous insulin production or activity. Although the cause of this illness is unknown, it has been linked to viral infection, autoimmune disease, and environmental factors. While exogenous insulin as well as other medicines may help manage many aspects of diabetes, problems plaguing the vascular system, kidney, retina, lens, peripheral nerves, and skin are frequent and can be very expensive in terms of lifespan and standard of living. Increased oxidative stress is a well-known contributor to the incidence and progression of diabetes, as well as its consequences[1]. Diabetes is often accompanied by significant in free radical generation or a reduction in antioxidant defenses. The activation of transcription factors, advanced glycated end products, and protein kinase C are

some of the mechanisms through which increased oxidative stress contributes to diabetes complications. This review focuses on current diabetes and medication intervention experimental investigations conducted in the setting of in vivo assay systems. In addition, there are many in vitro tests and clinical trials that need their own study[2].

1.1.Free Radicals And Diabetes Complications: An Introduction

Free radicals in excess cause damage to cellular proteins, membrane lipids, and nucleic acids, leading to cell death. The production among these reactive oxygen-free radicals has been linked to a number of processes. The primary source of free radicals is thought to be glucose oxidation. In its enediol state, glucose is oxidized to an enediol radical anion, which is then transformed into reactive keto aldehydes and superoxide anion radicals in a transition-metal dependent process. In the presence of transition metals, superoxide anion radicals dismutase to hydrogen peroxide, which, if not destroyed by catalase or glutathione peroxidase, may result in the formation of highly dangerous hydroxyl radicals. Superoxide anion radicals may also generate reactive peroxynitrite radicals when they react using nitric oxide. Hyperglycemia also promotes lipid peroxidation of low-density lipoprotein through a superoxide-dependent mechanism, which results in the production of free radicals[3]. The interaction of glucose with proteins, which results in the production of an Amadori product and subsequently advanced glycation end products, is another major source of free electrons in diabetes.

1.2.Antioxidants: A Quick Guide

While hyperglycemia produces free radicals, this even compromises the endogenous antioxidant defense mechanism in a variety of ways throughout diabetes. Enzymatic and non-enzymatic methods are used in antioxidant defense systems. Vitamins A, C, and E, glutathione, and the enzymes superoxide dismutase, catalase, glutathione peroxidase, and glutathione reductase are all examples of antioxidants. Lipoic acid, blended carotenoids, coenzyme, various bioflavonoids, antioxidant minerals, and cofactors are among the other antioxidants. They act together to combat various kinds of free radicals in a synergistic manner. Vitamin E inhibits lipid peroxidation propagation; vitamin C inhibits hydro peroxide formation when combined with vitamin E; metal functionalization agents, such as penicillamine, bind transition metals entangled in some lipid peroxidation reactions and inhibit Fenton and Haber-Weiss-type public reaction; vitamins A and E scavenge reactive oxygen species[4].

1.3.In Vivo Diabetes Research Using Biomarkers Of Oxidative Stress

Peroxidation of Lipids both directly and via degradation to extremely hazardous hydroxyl radicals, hydro peroxides have harmful effects on cells. They could also combine with transition metals like iron or copper to produce stable aldehydes like malondialdehydes, which can harm cell membranes. Peroxyl radicals may deplete hydrogen in lipids, resulting in hydro peroxides, which promote the free-radical pathway even further. Inducing diabetes in rats with streptozotocin or alloxan causes a uniform rise in thiobarbituric acid reactive compounds, which is an indirect indication of increased free-radical generation. Reducing hydroxyl radical production would be an effective way to decrease hydroxyl-induced damage, and many substances have been tried as antioxidants in diabetic animals with different degrees of effectiveness. Treatment with nicotinamide, boldine, melatonin, aspirin, L-arginine or sodium nitroprusside, probucol, -lipoic acid, aminoguanidine, captopril, enalapril, or nitecapone, for example, may reduce the rise in TBARS associated with diabetes if administered before or soon after the diabetogen. Treatment with a combination of vitamins C, E, and gemfibrozil, probucol, and vitamin E also might reverse the development of TBARS after diabetes has been established. Plasma lipids and hemostatic risk factors are reduced by dietary supplementation with -lipoic acid, evening primrose oil, or sunflower oil[5].

1.4.Glutathione Levels

Reduced glutathione is a major intracellular redox buffer that may approach concentrations up to 10 mM. Glutathione functions as a direct free-radical scavenger, as a cosubstrate for glutathione peroxidase activity, and as a cofactor for many enzymes, and forms conjugates in endo- and xenobiotic reactions. Levels of glutathione are reported to be normalized by vanadyl, dehydroepiandrosterone, oil of Eruca sativa seeds, nicotinamide, L-arginine or nitroprusside, melatonin, and melatonin plus desferrioxamine when these antioxidants are given prior to or at the same time as the diabetogen[6].

1.5.Peroxidase And Reductase Of Glutathione

Proteolytic enzymes present in the cytoplasm, mitochondria, and nucleus are glutathione peroxidase and reductase. Glutathione peroxidase uses reduced glutathione as a hydrogen donor to convert hydrogen peroxide to water. Glutathione reductase uses the cofactor NADPH produced by glucose 6-phosphate dehydrogenase to recycle glutathione disulfide again to glutathione. In diabetic mice, the activity of glutathione reductase, whose regenerates cellular glutathione, is decreased in the retina and plasma but elevated in the cardiac. Antioxidants such as -lipoic acid, quercetin, piperine, isoeugenol, coenzyme, Larginine, and nitroprusside had no influence on these benefits.

- **Catalase**

Peroxisomes contain catalase, which decomposes hydrogen peroxide into water and oxygen. Changes in enzymatic activity in diabetic mice that have been chemically induced. Catalase activity, for example, is continuously increased in the heart and aorta, as well as the brain, of diabetic rats. Catalase activity in the liver and kidney of diabetic mice is enhanced, despite reduced renal, hepatic, and red blood cell catalase activity. Psychotherapy with captopril, amino guanidine, melatonin, acetylsalicylic acid, DHEA, probucol, -lipoic acid, and stobadine, all of which were given before or at the same time as the diabetogen, corrected the changes in catalase activity caused by diabetes[7]. Treatment of established diabetes for four weeks or longer, on the other hand, somehow doesn't prevent or normalize diabetic consequences. Melatonin, quercetin, coenzyme, piperine, isoeugenol, gemfibrozil, and combination vitamin C, vitamin E, and carotene, for example, have no reversal effects.

- **Vitamins**

Vitamins A, C, and E are obtained from food and directly detoxify free radicals. They additionally participate in recycling processes, resulting in decreased vitamin forms. -Tocopherol is replenished when ascorbic acid recycles the tocopherol radical, and glutathione recycles the dehydroascorbic acid that is produced. Under some circumstances, these vitamins also promote toxicity by producing pro-oxidants. Vitamin E, which is part of the whole Peroxyl radical-trapping antioxidant system, shields membranes from lipid peroxidation by reacting directly with Peroxyl and superoxide radicals as well as singlet oxygen. Vitamin E insufficiency is associated with an increase in peroxides and aldehydes in various tissues. There have been contradictory findings on the amounts of vitamin E in diabetic animals and humans. Diabetes has been found to have no effect on vitamin E levels in the blood or tissues, as well as an increase or reduction in vitamin E levels. Discrepancies across studies. For example of the preventative or detrimental effects of vitamin E on diabetes-induced vascular aberrations may be due to the different types of blood vessels studied or the vitamin E dosage given.

- **Percentage of Nitrite**

Increasing data indicates that oxidative stress and alterations in nitric oxide production or activity are important factors in the development of diabetes problems. In the presence of biopterin,

NADPH, and oxygen, nitric oxide synthase converts arginine to citrulline. Nitric oxide, at normal levels, has a number of beneficial effects on the vascular system. Furthermore, late diabetes problems have been related to increased oxidative stress and consequent activation of the transcription factor NF-B. Nitric oxide production is increased by NF-B, which also is thought to be a mediator of islet beta-cell destruction. Nitric oxide may generate reactive Peroxyl nitrite radicals when it reacts with superoxide anion.

1.6.Pathophysiology Of Diabetes

Insulin stimulates the absorption of glucose and its utilization by muscle and fat cells. Insulin also inhibits glycogenolysis and gluconeogenesis in liver tissue, as well as lipolysis in adipose tissue. Some mechanisms are redirected in the other way if insulin isn't working correctly. When cells fail to eliminate glucose, extracellular glucose levels rise while glucose levels within the cells fall. Lipolysis rises, fatty acid and diabetic ketoacidosis increase, and protein or gamma globulin production decreases as a result. Hyperglycemic coma and osmotic diuresis may occur as a result of an elevation in extracellular glucose[8].

- **Diabetes Consequences**

Metabolic acute complications and systemic late complications, which have been divided into microvascular and macrovascular degenerative problems, are two types of diabetic complications. Hypoglycemia, hyperglycemia, hyperosmolar hyperglycemia, and diabetic ketoacidosis are among acute consequences. Eye difficulties, foot problems, heart attack and stroke, renal problems, nerve damage, gum disease and other oral problems, as well as associated diseases including cancer and sexual problems in men and women, are examples of systemic late consequences. Microvascular degeneration includes retinopathy, nephropathy, neuropathy, and foot issues, whereas macrovascular degeneration includes cardiovascular disease, stroke, and peripheral artery disease.

1.7.Hyperglycemia And Non-Enzymatic Glycosylated Proteins

By a process combining glucose oxidation, protein glycation, and oxidative degradation, diabetic hyperglycemia causes an increase in free radical production. The consolidation of glucose with the -amino group of lysine, the -amino group of an N terminal amino acid, or perhaps the amines of nucleic acids is known as glycation (non-enzymatic glycosylation). The very first reaction is the creation of an unstable Schiff base, which is reversible and achieves a steady state in hours. Rearranging the Schiff base into an Amadori product takes around 28 days to achieve a steady state and is also reversible[9]. Amadori products undergo numerous dehydration events and rearrangements to permanently produce AGEs when molecules have sluggish turnover rates. Several of the irreversible consequences of diabetes, such as enlarged extracellular matrix, cellular hypertrophy, hyperplasia, and vascular problems, are thought to be caused by AGEs. Fructosamine and glycated hemoglobin levels are two markers used to estimate the degree of protein glycation in diabetes. Glycation that occurs without the use of enzymes may affect the structure and function of antioxidants.

Only a few medicines, such as melatonin, probucol, vitamins C and E plus -carotene, and -lipoic acid, decrease high blood glucose levels in diabetes. Because most antioxidants do not cure diabetes-induced hyperglycemia, they must be used in conjunction with insulin treatment.

1.8.Peroxidation And Diabetes Mellitus-Related Parameters

Free radicals are extremely unstable chemical entities containing one or more unpaired electrons that have a particular characteristic. Free radicals are required for intracellular signaling as well as extracellular signal-regulated enzyme pathways that control gene expression. Radiation,

pollutants, RNS, ROS, smoking, neutrophils and macrophage formation, and industrial emissions are all sources of free radicals in cells and their environment.

Furthermore, free radicals have harmful consequences, and the body employs a variety of antioxidant mechanisms to protect itself from these harmful effects. The body suffers from oxidative stress when the equilibrium between the quantity of free radicals and the antioxidant capacity of the body is disturbed. Alongside cellular deterioration, oxidative stress eventually leads to cell death, and oxidative stress has been linked to the etiology of more than 50 disorders thus far.

2. LITERATURE REVIEW

E. Birben et al. studied the several researchers have associated oxidative stress to the pathogenesis of chronic problems. The generation of oxidant agents such as reactive oxygen and nitrogen species rises during hyperglycemia. Oxidative stress is caused by this process, which is accompanied by a reduction in the activity of antioxidant enzymes. This redox imbalance damages essential biomolecules such as proteins, lipids, and DNA, and leads the body to produce toxic compounds. Several pathways, including flux through into the polyol pathway, intracellular production of advanced glycation end merchandise precursors, protein kinase-C activation, and increased activities of the hexamine pathway, are implicated in the creation of conditions of oxidative stress and, as a result, diabetes complications. The research of polymorphism in the genes of antioxidant enzymes, from the other hand, shows that certain gene polymorphisms decrease the antioxidant activity of the enzymes. This article will cover a number of research to show how oxidative stress plays a part in the development of diabetes and how antioxidants may help diabetic complications [9].

Abraham Nyska studied the Oxidative and other radicals have a role in a wide range of biological processes, including mutation, cancer, degenerative and other illnesses, as well as ambition, aging, and development. ROS are widely known for their dual roles as both harmful and helpful organisms. The goals of this overview are to characterize oxidative stress phenomena, terminology, definitions, and basic chemical characteristics of the species involved; examine biological benchmarks susceptible to oxidation and also the organism's coping strategies against all of these reactive metabolites; and scrutinize methodologies, which would include immunohistochemically markers, used during toxicological pathology in the species involved. Because ROS and other free radicals are close to the end and strongly reactive in a generic way, direct detection is challenging. As either a result, secondary products such as amino acid derivatives, nucleic acids, and lipid peroxidation are often measured to assess ongoing oxidative damage. The overall reducing power of biological fluids and tissues has been evaluated using electrochemical techniques based on voltammetry measurements. This method may be used to evaluate a biological site's phytonutrients ability and track changes in pathological conditions. As a result, this review covers a variety of subjects that are important to comprehending oxidative stress phenomena, as well as tools for those who want to study and research in this area[10].

Awanish Kumar studied the production of reactive species as well as free radicals, which cause oxidative and nitrosamine stress, is intimately related to the multitude of problems associated with diabetes. Increased oxidative stress is a universal cause and consequence of diabetes, and it's believed to be at the root of the cellular alterations that produce diabetic problems. The whole relationship between the variables chain creates a vicious cycle that lies underneath several layers of possible medicines in its study. In this respect, this review summarizes the research on the link between type 2 diabetes and increased lipid peroxidation, as well as the efficacy of different antioxidants that are or may be utilized to reduce oxidative stress. A single antioxidant treatment strategy cannot be the solution since the difficulties are like a woven matrix of many

degrading processes. As a result, novel fixed-dose combinations of efficient antioxidants that target major reactive oxygen generating sources, imitate endogenous antioxidants, and scavenge reactive species produced are needed to balance the pro and antioxidant cycle. This study focuses on preclinical and clinical trial results with therapeutic antioxidants in type 2 diabetes, as well as a short discussion of antioxidant-based treatment successes and mistakes[11].

3. DISCUSSION

In particular, oxidative stress is implicated in the development and progression of diabetic problems. Furthermore, the findings of many studies indicate that antioxidants, particularly those containing numerous antioxidant biomolecules, such as vegetables, fruits, and seeds, are helpful in avoiding diabetic complications. However, extensive clinical studies have demonstrated that a high amount of one kind of antioxidant may be detrimental, since antioxidants eliminate free radicals by giving them electrons, and in the exclusion of other appropriate antioxidants, it can convert into a pro-oxidant. Because several antioxidants in fruits and vegetables form an antioxidant chain, it is suggested that vegetables, fruits, and herbs having numerous molecules of antioxidants be utilized instead of taking a single antioxidant in large doses for the treatment of illnesses like diabetes. To summarize, large-scale cohort studies, as well as systemic and meta-analysis investigations, are required to determine whether antioxidant substances and circumstances have a beneficial effect on diabetes recovery.

CONCLUSION

Evidence on the influence of oxidative stress in diabetic complications are covered in this article. The findings indicate that glucose metabolism and FFA enhance oxidant products like ROS and RNS via various routes, resulting in oxidation of key bio-macromolecules like lipids, nucleic acids, and proteins, along with nephropathy, neuropathy, and cardiovascular disease. Diabetes in rats caused by STZ or alloxan is a well-known animal model of type 1 insulin-dependent diabetes mellitus. Increased oxygen free radical generation has been related to glucose oxidation and non-enzymatic protein oxidative stress, both of which contribute to the development of diabetes and its complications. Exogenously given antioxidants' therapeutic benefits in animal models have already been widely investigated in recent years, giving some understanding into the connection between free radicals, diabetes, as well as its consequences. In vitro and clinical investigations may offer new helpful methods to investigate the correlations between oxidant stress as well as diabetes, and more research into the pathways through which increased oxidative stress accelerated the development of diabetic complications is essential.

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A REVIEW ON NATURAL SURFACTANTS

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ABSTRACT

Natural surfactants, also known as bio surfactants, are exogenous amphiphilic biological chemicals generated by a range of microorganisms from a number of sources, including waste products. Because of their unique characteristics, including such low toxicity, functioning under severe circumstances, based on renewable chemicals, and biologically degradable nature, there's always growing interest in this subject. Since of relatively low toxicity, biodegradability, and relative stability in a variety of physicochemical conditions, they are referred to as "ecofriendly." Despite having a wider range of structures and superior physicochemical characteristics than chemical solvents, bio surfactants cannot compete with comparable synthetic counterparts due to high upstream and downstream costs. Low productivity, costly downstream processing, as well as a lack of adequate knowledge of the bioreactor technologies for their synthesis limit the commercialization of these environmentally beneficial biomolecules. However, we anticipate that in the future, improved reactor design and material recycling technologies will be developed, as well as the screening of overproducer microbial strains. The current study focuses on bio surfactants in general, including their characteristics, benefits and drawbacks, manufacturing, characterization, and use, as well as recommendations for future research.

KEYWORDS:*Applied Aspects, Bio Surfactants, Biodegradability, Future Trends, Productions.*

1. INTRODUCTION

Surface Active Agencies, or SURFACTANTS, are amphipathic compounds with the capacity to form micelles. Surfactants are effective emulsifiers, dispersing, and foaming agents because of their surface activating capacity. They aid polar chemicals' immersion in organic solvents. Surfactants are also the active components in soaps and detergents, and they're frequently employed to remove oily materials from a given medium[1].

So far, the focus has been on developing an alternative environmentally benign method for producing various types of organic or bio surfactants. Surfactants produced by living cells are known as bio surfactants. They have the unique ability to decrease surface and interfacial tension via the same processes as synthetic surfactants. The main activities of bio surfactants include

emulsification, dispersion, dissolution rate, foaming, wetting, detergent capacity, and antibacterial activity in certain instances[2]. Exolipase makes up the vast majority of bio surfactants, but some are cell-bound. Bio surfactants are biologically generated from different substrates such as oils, sugars, alkanes, and wastes by yeast, bacteria, or fungus. Sophorolipids were the very first microbial surfactants to hit the market. Because of their benign and biodegradable nature, bio surfactants are regarded ecologically beneficial. Bio surfactants have sparked a surge of interest owing to their eco-friendliness, variety, large-scale manufacturing potential, selectivity, performance under extreme conditions, and potential uses in environmental fortification. Bio surfactants have attracted the attention of the industry and academia in recent years[3].

1.1.Bio surfactant Characteristics

Surfactants have had both hydrophilic and lipophilic moieties, making them amphiphilic. Surfactants with this property may reduce surface and interfacial tension and produce emulsions. Because of their environmentally benign nature and reduced toxicity as compared to synthetic surfactants, enthusiasm in bio surfactant research and use is steadily growing. Emulsification, foaming, wetting, cleaning, surface activity, phase separation, and crude oil viscosity reduction are just a few of the many functional characteristics that make among the most versatile process chemicals. It until critical nanocrystals concentration is reached, the actions of bio surfactants are dependent on their concentration. Micelles, bilayers, and vesicles are formed by the association of bio surfactant monomer molecules above the CMC (Fig. 1). Bio surfactants have this characteristic, which allows them to reduce surface and contact resistance while also increasing the absorption and bioavailability of nonpolar organic molecules. Surfactant efficiency is typically measured using the CMC. The CMC of more effective bio surfactants is lower, implying that less bio surfactant is required to reduce surface tension[4].

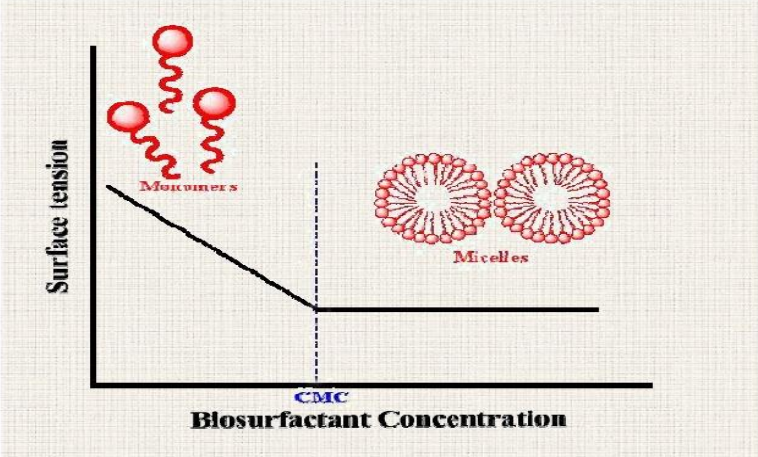

Figure 1: Relationship between surface tension and bio surfactant concentration & formation of Micelles

The following are recommended characteristics of bio surfactants:

- **Emulsification and De-emulsification:**

Emulsification is the dispersion of one liquid into another as tiny droplets, causing two or more substances to mix. Deemulsification is the process of breaking emulsions by disrupting the stable interface between the bulk and interior phases. This is crucial in the oil production process. Bio surfactants may be used to create stable emulsions with months or years of shelf life. The capacity of bio surfactants to maintain or destabilize the emulsion. Bio surfactants with a large molecular mass are often superior emulsifiers. T. bombicolasophorolipids have been

demonstrated to decrease surface and interfacial tension, although they are poor emulsifiers. Although liposomes do not decrease surface tension, they may emulsify edible oils. Bio surfactants have this characteristic, which is very helpful in the cosmetics and food industries[5].

- **Biodegradability:**

Bio surfactants seem to be much more biodegradable then their synthesized equivalents owing to their biological nature. Biodegradability tests of sophorolipids produced by the non-pathogenic yeast Candida bombicola, conducted in accordance with the OECD Guidelines for Chemical Testing, revealed that bio surfactants begin degrading immediately within a week of cultivation, whereas synthetic surfactants do not degrade after seven weeks. Another study found that rhamnolipids bio surfactants are biodegradable in both aerobic and anaerobic environments, while synthetic surfactant Triton X-100 is only partly biodegradable in aerobic and anaerobic environments.

1.2.Benefits

The majority of chemically produced surfactants are petroleum-based. As a result, they are often non-biodegradable and therefore hazardous to the environment. Synthetic surfactants, like other chemicals, may bio accumulate, and their manufacturing methods and therefore by can be harmful to the environment. Because there is a growing awareness of the need to preserve this environment, natural-source surfactants may be used instead of chemically produced ones. Despite their water solubility, they may have CMCs that are much lower than synthetic surfactants with comparable structures[6]. Nonionic, multicomponent mono rhamnolipids mixtures, for example, where the heptyl chain network that enables is the most common, with CMC values ranging from 1Mm to 10mM, depending on the ion concentration. The CMC value rises when the pH rises, and the rhamnolipids get deprotonated. Research has indicated that bio surfactants have many benefits over their co - products.

- **Biodegradability:**

These surface active substances do not stay in the atmosphere and are quickly destroyed by microorganisms due to their low toxicity, organic origin, and simple chemical structure.

- **Digestibility and biocompatibility**

They have an inherent compatibility due to their biological sources, which allows for unrestricted use in cosmetics, medicines, agricultural sectors, and as useful food additives.

- **Activities on the Surface and at the Interface:**

Mulligan claims that a good surfactant may reduce water's surface tension between 72 to 35 mN/m and the interfacial tension between water and cyclohexane from 40 to 1 mN/m. Surfactinsmay reduce the surface tension of water to 25mN/m and the water/hexadecane surface tension to 1mN/M.

- **Raw Material Availability:**

Bio surfactants may be made from a variety of relatively inexpensive basic ingredients. Carbon sources like as hydrocarbons, carbohydrates, and lipids may be utilized alone or in combination.

- **Production Economics That Are Acceptable:**

Hazardous wastewater and by-products may also be used to make bio surfactants, which is advantageous for large-scale manufacturing.

- **Specificity:**

Because bio surfactants are complex chemical compounds with particular functional groups, their actions are typically quite specialized. This characteristic is crucial in the detoxification of particular contaminants, the creation of specialized cosmetics, the de-emulsification of economic emulsions, as well as many medicinal and food applications.

- **Environmental Management:**

Bio surfactants are useful for oil spill cleanup, industrial emulsion handling, industrial effluent detoxification and biodegradation, but instead contaminated soil biosorption.

1.3.Disadvantages

Despite their many benefits, bio surfactants can have the following drawbacks.

- **Toxicity:**

Although bio surfactants are believed to be ecologically benign, certain studies have shown that they may cause toxicity in the environment under specific conditions. The impact is lesser when compared to synthetic surfactants. Again, bio surfactants have no negative effects on the kidneys, heart, lungs, or liver, and they do not interfere with normal blood clotting time. So, with cautious and regulated application, these intriguing surfactants will undoubtedly aid in the improved cleaning of harmful environmental contaminants and offer us with a healthy living environment.

- **Expensive Large-Scale Manufacturing:**

Large-scale production of natural surfactants may be costly. However, this issue may be solved by using waste substrates while also fighting their polluting impacts, thus balancing the total expenses.

- **Finding Pure Substances Is Difficult:**

Pure substances are difficult to come by, which is especially important in food, cosmetics, and pharmaceutical applications. It may be caused by the many processes needed in separation process of diluted broths.

1.4.Characterization of Bio surfactants

Surfactants that are chemically produced are typically categorized based on the type of their polar groups. Bio surfactants are classified primarily according to their chemical structure and microbiological origin. They are amphiphilic in structure, with a hydrophilic and a hydrophobic moiety. The rate of solubility of bio surfactants in water is determined by their hydrophilic component. Capillary action is controlled by the lipophilic portion. Ester linkage (particularly lactones) with organic and inorganic acids, amide linkage (single and peptide), or glyosidic linkage connect these two components[7].

- Surface active molecules with low molecular weight: capable of effectively lowering surface and interfacial tension. Glycolipids, lipopeptides, and phospholipids are three of the most common types.
- Surface active compounds with a high molecular weight are excellent emulsion stabilizers. Polymeric and particulate surfactants are two of the most common types.

1.5.Manufacturing of bio surfactants

During their development, many microorganisms, including bacteria, yeasts, and fungus, may generate surface-active compounds[8]. As an example, Rhanolipids from Pseudomonas aeruginosa and Surfactin from Bacillus Subtilis are two bacteria that produce bio surfactants.

1.5.1. Bio surfactant-producing yeasts: Torulopsisbombicolasophorolipids and Candida petro hilum peptididolipid.

1.5.2. Bio surfactants produced by fungi: Sophorolipids from Candida batiste and Candida bombicola

- Oil Residues: Oil wastes from vegetable oil refineries and indeed the food sector are utilized as suitable substrates for the manufacture of bio surfactants. Sunflower seed oil and oleic acid may be utilized by Thermos thermophiles HB8 to produce rhamnolipids. Incorporating these less expensive oils and oil wastes as a feedstock in industrial production medium may lower total bio surfactant manufacturing costs.
- Dairy Protein powder: One kilogram of paneer yields about 6 liters of whey. Whey from the dairy industry may also be used as a cheap and long-lasting substrate for bio surfactant fermentation. Via dairy waste as a substrate, the yeast Cryptococcus curates was able to produce large quantities of sophorolipids using a two-stage growth method.
- Starchy Refuse: Starchy waste materials are also low-cost raw materials that may be used to make bio surfactants. The potato processing business generates a significant amount of starchy trash. Carbon, nitrogen and sulfur, inorganic minerals, trace elements, and vitamins are all abundant in these wastes. Thompson reported on the use of potato effluents as substrates for surfactant synthesis.
- Molasses: Molasses is a co-product of the sugar industry that is produced during the production of sugar from sugar beet or sugarcane and is a significant source of accessible carbon. For the synthesis of rhamnolipids bio surfactant utilizing P. aeruginosa, Patel and Desai used molasses and corn-steep liquor as the main carbon and nitrogen sources.

1.6. Factors Affecting Bio surfactant Production

Bio surfactant synthesis is influenced by both the producer strain and the culture conditions[9]. As a result, a number of factors influence not just the quantity of bio surfactant used, but also the kind of product that is generated.

- **External Factors:**

Having a significant amount of bio surfactants necessitates optimizing the bioprocess, since variations in pH, temperature, aeration, and agitation speed may all affect the result.

- **pH:**

Zinjarde and Pant investigated the impact of pH on bio surfactant synthesis. They found that the product performed best at a pH of 8.0, which is really the typical pH of sea water.

- **Climate:**

Various microbial activities for the generation of bio surfactant are temperature sensitive and are influenced by small changes in temperature. The majority of bio surfactant manufacturing reported so far have been done at temperatures between 25 and 30 degrees Celsius.

- **Aeration and Agitation:**

Simultaneous aeration and agitation help oxygen transport from the gas phase to the aqueous phase. As a result, these are important variables that affect bio surfactant synthesis.

- **Carbon Sources:**

Organic substances play an important role in microorganism development as well as the generation of bio surfactants. Water-soluble carbon sources include glycerol, glucose, mannitol, sodium acetate, and ethanol, while water-immiscible carbon sources include n-alkanes and olive oil.

- **Nitrogen Sources:**

N is required for microbial development since it is required for protein and enzyme synthesis. As a result, nitrogen is critical in the bio surfactant manufacturing process. Several nitrogen molecules have been utilized to make bio surfactants, including yeast extract, ammonium nitrate, ammonium sulphate, urea peptone, sodium nitrate, meat, and malt extracts. The most common nitrogen source for bio surfactant synthesis has been discovered to be yeast extract.

Natural detergents are becoming more popular as environmental concerns about surfactants grow. Krister Holmberg's research, which focused on work published since 1998, looked at three types of natural surfactants: amphiphilic generated by yeast or bacteria, amphiphilic with a natural polar head group, and amphiphilic with a natural hydrophobic tail. Surfactants of both high and low molecular weight are produced by microorganisms. The study focused on molecules of low molecular weight. Sugars and amino acids are two of the most prominent natural-source surfactant polar water molecules. Alcohol surfactants are a hot topic of study, and the review includes three different types: alkyl glucosides, alkylglucamides, and sugar esters. Triglyceride monoethanolamides and sterol ethylates are two kinds of natural hydrophobic tails used as surfactants. Surfactants produced via organic synthesis are addressed in terms of their production routes as well as their physico-chemical characteristics[10].

2. DISCUSSION

The commercial application of bio surfactant on a wide scale is restricted due to their complexity and high manufacturing costs. Rhamnolipids and surfactin have been commercially accessible till now. Even at these businesses, however, easily accessible goods are not always for sale. One of the reasons for this may be because rhamnolipids are the only bio surfactant authorized for use in medicines, cosmetics, and food items by the US Environmental Protection Agency. Surfactants generated by bacteria and yeast, surfactants based on either sugar or amino acid as

polar head group, and surfactants based on either fatty acid or sterol as hydrophobic tail have all been reviewed in recent years. All three categories are significant and have a lot of study going on in them. Natural surfactants produced via these methods are usually well described, and their performance is comparable to that of conventional surfactants.

3. CONCLUSION

Despite many laboratory successes in bio surfactant synthesis, industrial scale production remains a challenge. Any product's commercial manufacturing is determined by market demand, raw material availability, and production cost. The generation of bio surfactant is hampered by low productivity, high downstream processing costs, and a lack of adequate knowledge of bioreactor systems. We anticipate that super-active microbial strains will be created in the future utilizing genetic manipulation for industrial production. In the future, new techniques will be developed, as will the finding of more trustworthy sources. As a result, yields would be higher, manufacturing costs would be lower, and novel bio surfactants would be found, with the chemistry of these molecules better understood. As a result, bio surfactants will soon be able to compete effectively with their synthetic counterparts in the surfactant business

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EVIDENCE FROM INDIA: IMPACT OF MOBILE PHONE TECHNOLOGY ON THE PERFORMANCE OF AGRICULTURAL EXTENSION SERVICES

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ABSTRACT

The effect of mobile phone increased involvement in agricultural extension delivering services in India is investigated in this research. The quantity, quality, and speed of delivering services have all increased substantially as a result of the intervention, according to the statistics. There are additional advantages in terms of increased knowledge and awareness of new agricultural techniques, farmers' desire to experiment with new technologies in the future, and financing availability. Farmers from low-income and low-education backgrounds are not discriminated against in the system. As a result, a well-utilized technology system aided by trained village youngsters may be used to promote inclusive development. The fundamental source of development is vertical innovations produced by a developing research industry, according to an endogenous growth model. The quantity of research in each period is decided by the anticipated amount of research in the following period, according to a forward-looking difference equation. Creative destruction is one cause of this intertemporal connection. In other words, the possibility of greater future research deters current research through threatening to suffocate the rents generated by current research.

KEYWORDS: *Agricultural, Extension, Mobile Phase, Services, Technology.*

INTRODUCTION

Small - scale farmers, who predominate the developing world's terrain, need sufficient access to education, information, and other services in order to enhance their agricultural practices. It is critical to provide farmers with the necessary information and services in some kind of a timely and effective manner. Due to the absence of infrastructure, farmers in rural communities are excluded. Agricultural extension services are an essential instrument for transferring information, providing guidance and education to farmers concerning new techniques and equipment, and encouraging positive agricultural advances. Due to a lack of information, expertise, inputs, and management, farmers often adopt sub-optimal agricultural methods. The preponderance of resource-poor farmers in India have limited access to public services; almost 60% are excluded[1]. Enhanced version staff must collect and provide a wide variety of

information to small farmers in a timely manner. Farmers have a pressing need for market data, land records, farm management data, and pest and disease control information, as well as pesticide usage and management. Digital revolution (ICT) may play a significant role in this respect. In agriculture, however, ICT is not completely used. Farmers who are poor and disadvantaged, women, and rural regions are all excluded. Farmers need suitable ICTs to utilize and enhance their knowledge of agricultural techniques[2].

Cole and Fernando (2012) assess the effect of agricultural counseling services (referred to as AO) that consist of a weekly automated voice message delivered to chosen farmers. Their study, on the other hand, concentrates on cash crop farmers who must have access to a cell phone. These two criteria ruled out the most vulnerable farmers. Furthermore, the fact that they used a randomized design within the same village increases the risk of spillovers from the treatment to the control group. This project sent a uniform push notification to all programed mobile phone users. Although voice messages provide information, they do not allow receivers to express their urgent requirements. As a result, the service's efficacy will vary from that of those that provide responsive capacity building[3].

The benefits from SMS messages regarding market and environment information sent to farmers' mobile phones are estimated by Fafchamps and Minten (2012). They discovered that treatment had an impact on crop grading and spatial arbitrage, although the size of the effect was modest. Farmers who benefited from this service, like those who benefited from the AO initiative, possessed cell phones without the ability to record videos. Farmers sometimes find it difficult to explain difficulties in their own language, therefore video pictures might be helpful in properly presenting the issues to advisors. Farmers are solely recipients of push notifications sent to their cell phones[4].

1.1.Background

Agriculture extension programs in India have undergone significant modifications. The demand for extension services far outnumbers the available supply. Civil service and public spending reform, training and capacity development, public-private partnerships, and ICT use are among the supply-side initiatives. The governmental sector's Diversified Agricultural Support Project and National Agricultural Technology Project, as well as the private sector's e-Choupal project, are examples of initiatives. In rural regions, E-Choupal includes the installation of PCs with Internet connection[5]. Many limitations face public sector programs, including inadequate communication, insufficient ability, and a lack of sufficient funding. Without rapid technology, smallholder participation in distant places is severely limited. In 2008, mobile phones were not common in rural India, particularly in impoverished areas like Madhya Pradesh, and no one owned a smartphone. A few projects have utilized ICT to improve agricultural extension services, but the poorest farmers are still out of reach.

1.2.The KHETI Initiative

The KHETI method consists of village helpers known as Munnas who utilize cellphones to produce Short Dialogue Strips to help small/marginal farmers communicate with agricultural specialists. SDSs are audio-visual productions on agricultural problems and expertise in the local area. This revolutionary mobile phone-based information system, which is driven by demand, allows users to send and receive multi-media communications. Farmers wanted prompt and high-quality services, but the availability of such services was hampered by the physical distance between farmers and agricultural specialists. Similar issues were discovered in other investigations[6]. The KHETI was launched by the Sironj Crop Producers Company Private Limited, a cooperative-type NGO. SCPCL was founded in the Sironj Block of Madhya Pradesh's Vidisha district in Central India. Members of the SCPCL have restricted access to assets. The infrastructure in villages is inadequate. Wheat, gram, and maize are the major winter crops,

while soybean is grown during the rainy season. Prior to the invention, SCPCL offered information and services to its members in the same way as KHETI did, but it had trouble reaching all of them in a timely manner.

The KHETI system is shown in Figure 1. In comparison to the AO project, KHETI is more creative since farmers may show specialists footage of their issue, such as a pest assault, and get better answers. Munnas serve as mobile phone carriers and assist customers with video production. In three stages, KHETI is anticipated to have an effect on results. First, agricultural extension services would be more widely used, faster, and of higher quality. Second, increasing the quantity, quality, and speed with which agricultural services are provided will enhance farmers' knowledge and skills[7]. Third, agricultural production, income, and welfare are anticipated to be influenced by knowledge and skills. There are many important variables at play in each stage. Farmers are likely to utilize the services to bring about desired improvements if the services are of sufficient quality, but this may be influenced by key variables.

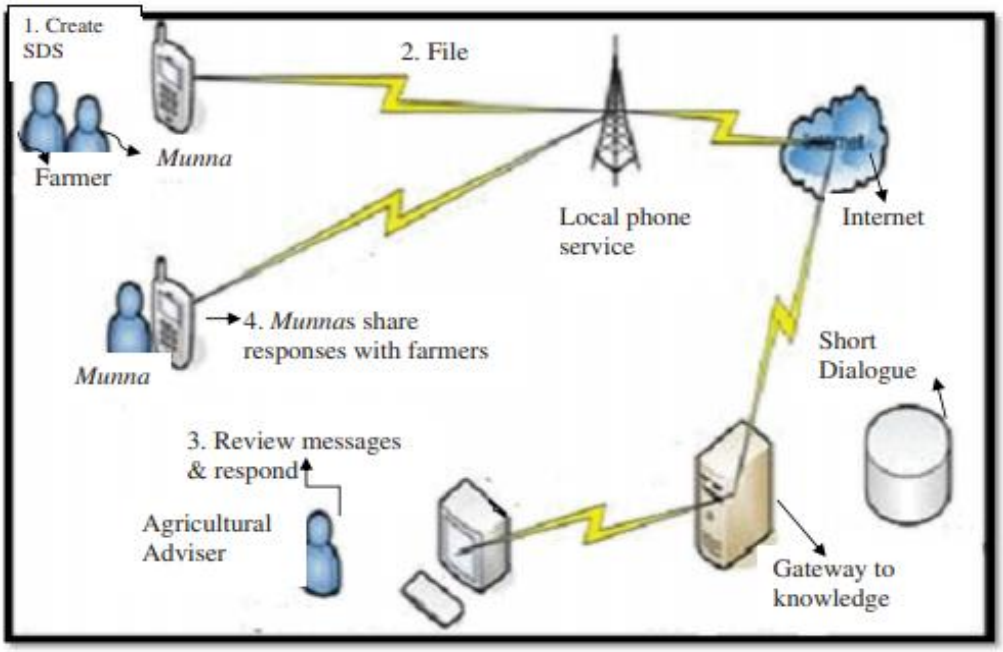

Figure 1: Using Short Dialogue Strips to seek advice from agricultural adviser.

Producers are believed to have the ability to absorb knowledge since KHETI is demand-driven. The causal chain should work if the restrictions to utilizing the services are eliminated; farmers would utilize the services to bring about the desired improvements.

1.3.Indicators of Impact

The following is how we assess impact:

Where I stands for ‘impact,' O for the magnitude of the interpretable impact indicator, T and C for treatment and control groups, I for sample units, and n for sample size. As a result, the impact is defined as the change in outcome as a result of an action.

We look at indicators including changes in the amount and quality of extension services used, as well as the usefulness, speed, and increase in agricultural knowledge. We also looked at how KHETI has affected farmers' attitudes and aspirations. We concentrate on those other under-researched aspects of rural development for the following reasons. Employment has been

employed as a common metric of effect, but we focus on all other inadequately dimensions of poverty alleviation for the reasons stated[8].

For starters, many aspects of rural development may be measured not just in terms of increased "farm productivity/income," but also in terms of increased farmer skills. In today's world, enhanced knowledge and skills have a far wider relevance and applicability (Sen, 1989). We have highlighted increased capacities via the extra quality and quantity of information that farmers acquire through KHETI since knowledge is an important prerequisite for any type of future effect. Also, being acquainted with a modern technology indicates that you are aware of a larger range of options. Experimenting with or watching any new technology necessitates some level of active participation, which is a legitimate engagement in and of itself. Farmers would select the best option from their choice bundle after learning about new techniques.

1.4.Resultant Effects on Beneficiaries & Delivery

The following is how access and knowledge were conceived. Farmers were asked to evaluate their primary limitations, as well as whether and to what degree these constraints had been alleviated since the introduction of mobile-enabled Munna services.

- The four major restrictions have the following characteristics:
- A basic understanding of agriculture,
- New manufacturing methods and technologies
- Basic agricultural activity funding, and
- Financial support for the use of certain agricultural knowledge or practices

The inverse of these characteristics' scores is used to create an awareness-knowledge index. Farmers were permitted to respond to the relevant questions based on their own perceptions. Because they are from the same sub-district, we presume they have comparable cognitive abilities.

1.5.Effect on Farmers' Expectations

The experience of utilizing mobile phone technology to help agricultural extension services may have opened people's eyes to contemporary technology and external developments, as well as their significance to farming and life in general. We asked the farmers whether they believe their experience with KHETI would lead them to try more new agricultural technology in the future, and if they think their experience with KHETI will lead them to try more new technology and new ways of living in the future.

1.6.Effects of Heterogeneous Treatment

While the significance of technology advancement to development is undeniable, there is increasing worry about the potential of a "digital gap," in which the poorest and least educated are unable to fully benefit from new technologies' promise. We put this theory to the test by comparing AO use and knowledge acquisition across educational levels. We concentrate on respondent education for at least two reasons: first, although the service is intended to be accessible to illiterate users, a literate audience that can take advantage of instructional content may find it simpler to use or navigate. Second, educated people may have a greater ability to learn.

Years of education, pesticide use, even sowing decisions given the variations in the usage of and reported dependence on AO based on education, it's reasonable to ask whether we're seeing similar variances in how agricultural methods react to AO. We examine the impact of AO and education on pesticide usage and planting choices in tables not published. There are no effects

that are heterogeneous. Importantly, the most immediate and significant finding in our research is that imidacloprid adoption among AO users does not seem to change consistently with years of higher education[9].

1.7.Using information and communication technologies (ICTs) in agricultural extension

For decades, "traditional" ICTs have been utilized to provide advisory services. In developing nations, weather related agricultural information are routinely broadcast on radio and television, and rural tele centers have given information on pricing and quality. National agricultural ministries in several countries have tried to incorporate ICTs into knowledge delivery services by creating district information centers. Many of these efforts have shifted away from "traditional" ICTs and toward mobile telephony, which includes voice, SMS, and internet-based services, as mobile phone coverage has grown:

- Telephone-based knowledge delivery services that offer advice on agricultural techniques and market access are the most common kind of voice-based information delivery service. For agricultural extension assistance, several of these agencies utilize call centers or hotlines. The mechanisms vary from basic telephones (landlines or cell phones) to more complex technologies and computer applications.
- Regular radio broadcasts that offer market pricing and perhaps other agricultural information, along with dial-up radio that features a succession of brief segment audio programs, are examples of radio dial-up and broadcasts. A regularly updated repertoire of prerecorded agricultural material is often broadcast on the radio system. Farmers may ask the questions through SMS in certain instances, and the answers are broadcast over the radio in others.
- SMS-based extension services gather and distribute information primarily via message-based platforms. This covers data collecting through a simple SMS-based questionnaire, requesting information by SMS and getting a response via SMS, and receiving bulk SMS on agricultural subjects.
- Tele centers and internet kiosks are common features of e-learning programs, allowing farmers to access internet technology for agriculture-related knowledge[10].

Market pricing, weather, technical assistance, and local market providers and purchasers are among the types of information supplied through these various methods. The bulk of these services concentrate on market pricing, weather, and transportation costs, owing to the fact that this data is simple to gather and distribute, objective, and less prone to estimation errors. Projects that offer information on agricultural methods and inputs are uncommon, maybe because such data is more complex and harder to communicate.

DISCUSSION

The needy farmers benefited more from the intervention than the better-off farmers, according to this study's findings. There is a common misunderstanding that contemporary technologies help just the wealthy, but that they do not aid those at the bottom of the economic pyramid. According to the findings of the study, mobile phone technology may have a major developmental impact on the poor. This project's success may be attributed, in part, to the use of a suitable technology, Munna's mobile phone technology, rather than a more sophisticated networked Internet system in India's poorest regions. This is a valuable lesson for future technology for development initiatives that we can take from the KHETI experience. Our data also indicates that the mobile phone's integration of audio and video technologies, as well as the mediation of trained village youth, Munna, allowed farmers with low levels of education or land to benefit from this mobile phone-assisted extension service. If the services are more closely linked to agricultural methods and technology, and of higher quality, the effect is greater. Future research could focus on

identifying improvements in various farm practices, efficiency, and competitiveness as a result of enhanced extension services provided by mobile phone technology, and then directing innovation toward supporting efficient and competitive farm practices by small and marginalized farmers. The technology was implemented with the help of a research funding organization, however it cannot be maintained in its present state.

CONCLUSION

The effect of new, video-enabled mobile phone technology on the speed and quality of agricultural service delivery is investigated in this research. Small and marginal farmers who used the services increased their awareness and agricultural expertise, as well as their access to finance. This assessment is based on the KHETI action research project, which facilitates the rapid transmission of audiovisual conversations between farmers and agricultural specialists. Munnas, or local teenagers, use cellphone technology to link farmers with agricultural specialists. Its goal is to provide timely and suitable assistance to all chosen farmers in order to address their issues. We use data from structured questionnaires to gather pre- and post-intervention survey data. Farmers thought the services were of higher quality than before the intervention. Farmers have become more comfortable with new technologies and adjusting to new things for the future as a result of their use of the services. KHETI, on the other hand, may be modified by the government to enhance the effectiveness of its extension services delivery, given the present rise of cheaper cellphones and the cost-effective employability of Munnas. Munnas may be hired by the state government to save money by employing fewer specialized specialists for successful extension services. Partners may assist in the development of longer-term extension service effect indicators, allowing for the evaluation of sustainability and ongoing adoption of ICT-based interventions like the KHETI. Because current evidence of knowledge-aspirations-productivity links is still sparse, our findings suggest that intervention-based research investigating such connections be given more attention.

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REVIEW OF MICROALGAE-BASED BIOFUEL OIL AND GAS MANUFACTURING METHODS

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ABSTRACT

Many individuals mistakenly think that the material is exclusively used for transportation. Biofuel, on either hand, may generate hydrogen, clean oil, and even be used as a cooking oil. Biofuels may be used to replace a variety of energy sources, including vehicle fuel and central domestic heating. There have been two major concerns recently: the environment as well as the energy crisis. Global warming is a problem for the environment. Microalgae, as biomass, may be turned into energy such as biofuel oil and gas, making them a viable renewable energy source. This article provides a quick overview of the major microalgae energy conversion mechanisms. Due to the high-water content of microalgae, not all biomass energy conversion methods may be used. Oil or gas may be generated using thermochemical processes, while ethanol and biodiesel can be produced utilizing biochemical methods. Because the characteristics of the microalgae product are almost identical to those of fish as well as vegetable oils, it may be used as a fossil oil replacement.

KEYWORDS:*Bio Fuel, Oil Production, Micro Algae, Thermo Chemical, Biochemical.*

1. INTRODUCTION

Everyone understands that burning fossil fuels has contributed to global warming; therefore, renewable clean energy is needed to replace fossil fuels with biomass in order to decrease CO_2 emissions. Another problem is the energy crisis, which has an effect on domestic energy circumstances as well as local social life as global petroleum crude oil prices rise. As a result, in order to address the critical problem raised above, renewable energy should be created. Atmospheric concentrations of greenhouse effect greenhouse gases in the atmosphere have caused global warming, which has become a major environmental issue. Three fundamentally distinct approaches may be used to reduce the buildup of atmospheric CO_2, the main driving factor behind predicted global warming[1].

1.1.The Usage Of Fossil Fuels Is Being Reduced:

CO_2 removal from the atmosphere. CO_2 produced by fossil fuel burning is captured and sequestered or used before it reaches the atmosphere. Biomass energy would contribute to a

reliable energy supply as well as to local community by increasing economic activity. Biomass may be obtained via the cultivation of specialized energy crops, the collection of forestry and other plant leftovers, and the use of biomass waste. By thermochemical liquefaction, even trash from homes and food businesses may be utilized as a raw material for oil production. Microalgae, for example, have a greater photosynthetic efficiency than other biomasses like trees. Microalgae may be utilized as a fuel substitute of fossil fuel if fuel can be extracted effectively from them. Biomass is a very attractive resource since the generation of fuel from photosynthetic organisms is a renewable process that uses sun energy. Biological CO_2 fixation and energy generation are anticipated to be viable options for reducing atmospheric CO_2 levels and averting future energy crises. Microalgae have long been recognized to use CO_2 gas as a source of carbon for growth. The reduce the amount of carbon dioxide levels in the atmosphere is a significant challenge, and various physical and chemical solutions have been suggested. Microalgae may generate micro algal oil via biological conversion to lipids or hydrocarbons or thermochemical liquefaction of algal cells, in addition to their capacity to fix CO_2. Lipids and fatty acids are found in microalgae as membrane components, storage products, metabolites, and energy sources. This article will cover a variety of techniques for converting microalgae to liquid fuel and gas, including biochemical and thermochemical approaches. Energy conversion through biochemical processes yields ethanol and biodiesel, while energy conversion via thermochemical processes yields oil and gas. The usage of microalgae oil products is also discussed in this article[2][3], [4].

1.2.Biomass To Energy Conversion

The following are some of the benefits of using microalgae as a biomass source: Algae are thought to be one of the most effective biological systems for collecting solar energy and producing chemical molecules. Algae are non-vascular plants that lack sophisticated reproductive organs (in most cases). Many algal species may be induced to generate large levels of certain, economically useful substances including proteins, carbohydrates, lipids, and pigments. Algae are microorganisms that divide their cells in a basic cycle. Microalgae may be cultivated in either seawater or brackish water. Algal biomass production systems are readily adaptable to different degrees of operational and technical expertise[5].

Microalgae, in fact, have the greatest oil output of any plant oil. It may yield up to 100,000 liters of oil per hectare per year, compared to 5950, 2689, 1413, or 952 liters per hectare for palm, coconut, castor, as well as sunflower, respectively. The Aquatic Species Program (ASP) looked at three major fuel generation possibilities. Methane gas, ethanol, and biodiesel are the three. Direct burning of algal biomass for the generation of steam or power is a fourth possibility, although the ASP did not give it considerable consideration. Many algae have a high oil content. According to Oilgae, the oil content of certain microalgae surpasses 80% of the dry weight of algal biomass, and others have around 15–40% (dry weight), while palm kernel has about 50%, copra has about 60%, and sunflower has about 55%. The oil component accounts for 64.4 percent of the total lipid component. Biochemical, thermochemical, and direct combustion are the three types of biomass energy conversion reactions[6]. Fermentation, anaerobic, bio - electrochemical fuel cells, and other bioconversion processes may be further split into fermentation, anaerobic digestion, bio electrochemical fuel cells, as well as other biochemical conversion processes. Gasification, pyrolysis, or liquefaction are the three types of thermochemical conversion. the microalgae energy conversion mechanisms Biomass may be transformed into three different products, two of which are energy-related and one of which is a chemical feedstock. Because microalgae have a high water content (80–90%), not all biomass energy conversion methods can be applied to them. Direct burning of microalgae, for example, is only possible for biomass with a moisture level of less than 50%. Biomass with a high moisture content is more adapted to biological conversion.

1.3.Production Of Microalgae

A wide range of systems may be used to grow microalgae. A tiny fermenter, internally lit photo bioreactor, or box style water tanks are used for small size or laboratory scale growth. The fermenter utilizes four fluorescent lamps as external irradiation, with a degree of irradiation of 10,000 lx or 20,000 lx at the inner surface of the fermenter vessel, or alternative light distributors. One of the main benefits of utilizing an internally constantly illuminated photo bioreactor or a flat plate photo bioreactor is that contamination may be reduced by heat sterilization under pressure. Algae may be produced in open culture systems or closed culture systems for large-scale growth. Natural water (lakes, lagoons, and ponds) and manmade ponds or containers are the two types of open ponds. Shallow big ponds, tank, circular pond, or raceway ponds are the most frequently utilized systems.

1.4.Production Of Energy

1.4.1. Thermochemical Transformation

Gasification Gasification is a chemical process in which carbonaceous materials (hydrocarbons) are partially oxidized with air, oxygen, and/or steam at high temperatures, usually in the range of 800–900 C, to produce synthesis gas (syngas). A flow diagram of a microalgae system for low-temperature catalytic gasification of biomass for fuel generation.

A new power generation system based on microalgae has been suggested, which includes nitrogen cycling and low-temperature catalytic gasification of the microalgae. Elliot has also created a low catalyst gasification of high-moisture biomass. Without drying, rising biomass is gasified straight to methane-rich fuel gas. In furthermore, during the process, nitrogen in the biomass is transformed to ammonia.

Liquefaction Micro algal cell crystalizes obtained via centrifugation have a high moisture content and therefore make excellent liquefaction raw materials. Direct hydrothermal carbonization in sub-critical water quality is a method for converting wet biomass materials to liquid fuel.

1.5.Pyrolysis

Pyrolysis is the process of converting biomass to biofuel, charcoal, and gaseous fraction by warming it to around 500°C in the inert atmosphere or in the presence of a catalyst at a rapid heating rate (103–104 K/s) and a short gas residence time to crack the biomass into short chain molecules, which are then rapidly cooled to liquid. Slow pyrolysis methods were used in previous research, with a modest heating rate and a lengthy residence period. Longer residence periods may result in secondary cracking of the main products, lowering output and compromising biofuel characteristics. A low heating rate and a lengthy dwell period may also increase energy consumption. Fast pyrolysis methods for biomass have gotten a lot of interest in recent years since they can maximize liquid yields, and there have been a lot of studies done on them.

Fast pyrolysis has the benefit of producing a liquid fuel immediately. The conversion of biomass to bio-crude with an efficiency of up to 80% is possible when flash pyrolysis is employed. A fluidized bed rapid pyrolysis device in concept.

1.6.Hydrogenation

Hydrogenation is a reductive chemical process that adds hydrogen (H_2) to organic compounds, usually to saturate them. The procedure involves the addition of hydrogen atoms to a molecule's double bonds with the help of a catalyst. In the presence of a catalyst and a solvent, algal hydrogenation is carried out in an autoclave at high temperatures and pressures. To accomplish algal conversion and enhance the transfer of momentum, heat, and mass, contact must be made

between the gaseous phase (hydrogen and hydrocarbon phase), liquid phase (combination of solvent and liquid product), and solid particle phase (algal and catalyst). As shown in figure 1, From a sparger at the reactor wall, the gases reactant was bubbling through the liquid, and the solid particles were slurried with the liquid and supplied to the reactor. The gaseous or solid reactants dissolve in the liquid phase first and then diffuse towards the catalyst with the liquid reactant. All of these reactants after which interact at the catalyst's surface. To maintain a consistent liquid level inside the reactor as well as a stable composition in the water form, the liquid products, solid particles, and unreacted ingredients were constantly taken out. Unreacted gaseous reactants and products entered the space just above surface of the liquid as well as exited via a gas pipe.

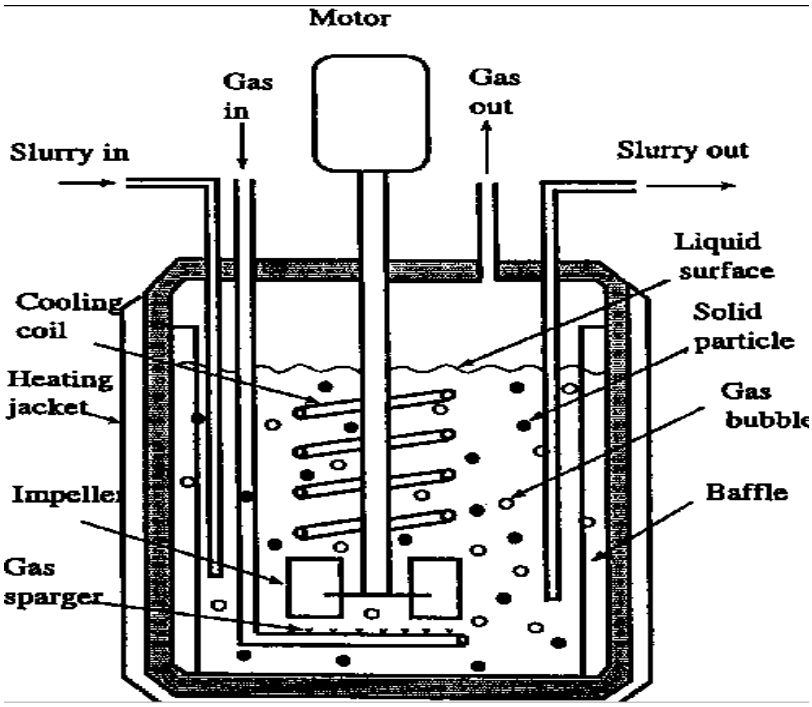

Figure 1: illustrate the Apparatus used for hydrogenation within an autoclave[7]**.**

1.7.Biochemical Transformation:

1.7.1. Fermentation:

Fermentation is the process of producing ethanol from microalgae. Microalgal cultivation, algal cell harvesting, slurry preparation, fermentation, as well as ethanol separation are all part of the process. Fermentation is widely used commercially to produce ethanol from sugar or starch crops in a variety of countries. The biomass is pulverized, and enzymes convert the starch to sugar. Yeast converts the sugar into ethanol. Distillation is an energy-intensive stage in the ethanol purification process. The following method may be used to make ethanol utilizing microalgal as a raw material. The starch of microalgae is liberated from the cells in the first stage, using mechanical equipment or an enzyme. When the cells start to disintegrate, yeast from Saccharomyces cerevisiae is introduced to the biomass to start the fermentation process. Ethanol is the end product of fermentation. The bioethanol is pumped out of the tank and into a holding tank before being fed into a distillation unit. Another study looked at the synthesis of ethanol via dark fermentation in the coastal green alga Chlorococcumlittorale. At 25 C, 27 percent of the cellular starch was destroyed in 24 hours under dark anaerobic circumstances, with cellular

starch breakdown increased at higher temperatures. Fermentation products included hydrogen, ethanol, acetate, as well as carbon dioxide. At 30 C, ethanol had a maximum productivity of 450 lmol/g-dry weights.

Figure 2: Illustrate the Diagram Showing Fermentation Process of Micro Algae

1.7.2. Transesterification

Transesterification is the process of replacing an ester compound's alkoxy group with another alcohol. An acid or a base catalyzes the processes in a homogeneous or heterogeneous catalytic process. The interaction of a fat or oil with an alcohol to produce esters and glycerol is known as transesterification. Glycerol and esters are formed when alcohol reacts with triglycerides. Biodiesel is the end product of the transesterification. The alcohol must be used in excess in order to get a high yield of the ester. Many studies claim that biodiesel may be made at home using basic procedures as well as equipment.

1.7.3. Applications of biofuels:

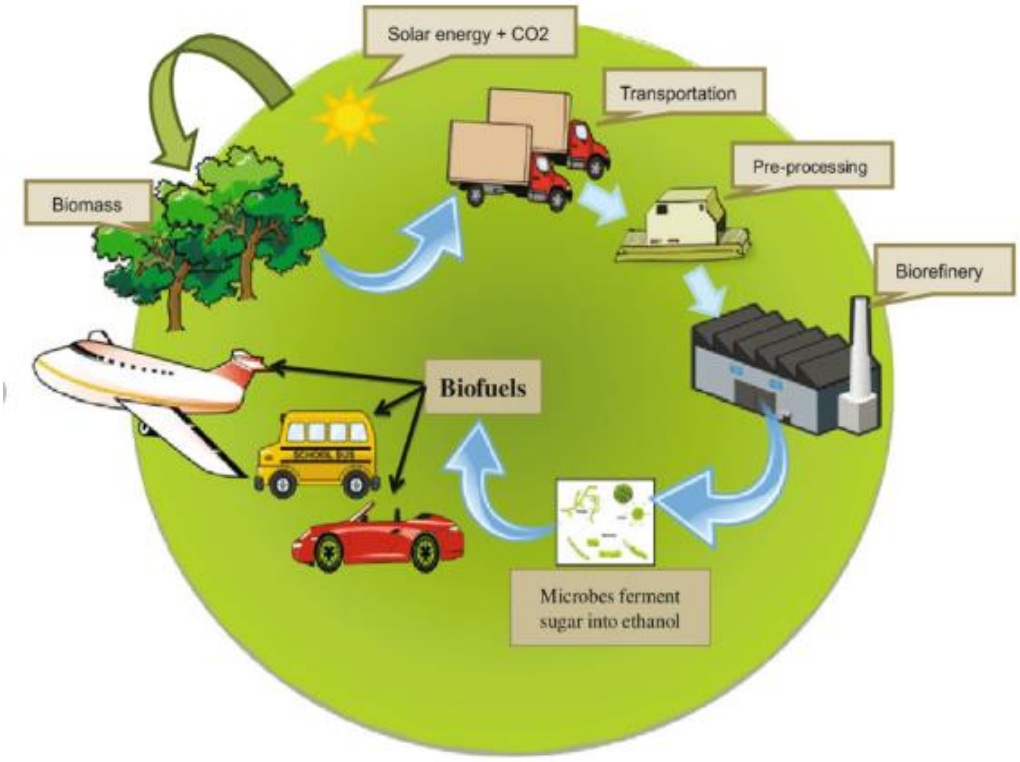

Figure 3: Illustrate The Major Application Of Biofuel.

LITERATURE REVIEW

Jeremiah David Bala et al. studied about Microalgae is regarded as among the most promising biofuel feedstocks. Because of their potential to decrease reliance on crude oil-based fuels and chemicals, interest in algae-based biofuels and chemicals has grown in recent years. Algae is the most appropriate and long-term feedstock for green energy production. However, a move to biofuels as an alternative product from algae has been accounted for by many difficulties connected with decreasing fossil fuel supplies as energy sources. Algae is a renewable energy source since it can repair greenhouse gases (CO_2) via photosynthesis and does not compete with food production. As a result, this chapter provides an overview of algae's potential for biofuel production, with a focus on macroalgae-based biofuels energy products derived from algae as the raw material. In a nutshell, algae are the most environmentally friendly fuel source available[8].

S.Kumar et al. studied about to encourage the development and use of biofuels, a wide range of regulations are in place, including policy goals, blending requirements, tax incentives, and other financial schemes. Biodiesel production in the area is led by Indonesia, while ethanol production is led by Thailand. The article examines these nations' biofuel policies, underlying causes, and prospects for long-term biofuel development. In these nations, favorable legislative and economic processes have played a significant role in the production, use, and market penetration of biofuels. Though each of these nations has seen some setbacks in their output, overall, biofuel production has risen, and an increasing trend is expected in the future if demand, consumption, mandate enforcement, and policy goals are met. The main motivation for these nations to seek biofuel production is not climate change. Sustainable biofuel production and dependence on second-generation biofuels, on the other hand, may enable these nations to convert their

development potential into economic income under carbon financing, thus addressing greenhouse gas emissions and climate change issues[9].

M.V.Rodionova et al. studied about In contrast to the limited nature, geopolitical instability, and negative global consequences of fossil fuel energy, it is becoming more apparent that biofuels may be a sustainable source of renewable energy. Biofuels are any energy-rich compounds produced directly via biological processes or obtained through chemical conversion of biomass from previous live creatures. Burning woody or cellulosic plant material and dry animal waste directly produces primary biofuels. Secondary biofuels are divided into three generations, each of which is produced indirectly from plant and animal matter. In this study, we discuss current advances in microbial biofuels production, including difficulties and possibilities, as well as prospective uses of microalgae as a biomass production platform. The search for novel bioenergy species, the optimization as well as improvement of culturing, genetic modification of biofuel-producing species, a full understanding of biofuel production mechanisms, as well as effective techniques for mass growth of bacteria should all be priorities in future biofuel research[10].

DISCUSSION

Many individuals mistakenly think that the material is exclusively used for transportation. Biofuel, on either hand, may generate hydrogen, clean oil, and even be used as a cooking oil. Biofuels can be used to replace a variety of energy sources, including vehicle fuel and central home heating. Among different plants such as palm oil, coconut, castor bean, and sunflower seeds, microalgae produce the most oil. Microalgae contain oil content ranging from 15% to 40% of dry weight, with some microalgae having as much as 80%. The total lipid component is expected to include 64.4 percent oil. Algae oil may be extracted using a number of techniques or a combination of techniques. Gasification generates combustible gases such as H_2, CH_4, CO_2, and ammonia, while pyrolysis provides biofuel.

CONCLUSION

Many individuals mistakenly think that the material is exclusively used for transportation. Biofuel, on either hand, may generate hydrogen, clean oil, and even be used as a cooking oil. Biofuels may be used to replace a variety of energy sources, including vehicle fuel and central home heating. Microalgae are a renewable energy source with significant CO_2 fixing potential. A significant amount of algal biomass is required for biofuel generation. Photo bioreactors or open ponds may be used to cultivate the microalgae. The biofuel may be utilized in engines and turbines, as well as in refineries as a feedstock. Ethanol is the fermentation product of microalgae. Ethanol may be used as a fuel or as a gasohol (100 percent alcohol). Algae oil may be turned to biodiesel using a transesterification method. The biodiesel product has primary properties that are very comparable to or compatible with regular petroleum diesel, and it may also be mixed with petroleum diesel in any proportion.

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THE PLACE OF GENRES OF FOLKLORE IN MODERN LITERATURE AND THE ISSUE OF STUDY

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ABSTRACT

This article discusses the role of folklore genres in modern literature and the stages of their study in Uzbek and world literature.Modern Uzbek literature develops through the creative use of national values and folklore traditions. In the field of literature, there are new studies devoted to the study of the influence of folklore on written literature. Researchers of the new era are increasingly striving to find the root causes of the charm and charm of fiction at the basis of folk oral art. This interest requires the study of the relationship between folklore and written literature in a new direction.

KEYWORDS: *Folklore, Folklorism, Prose, Poetry, Analytical Folklorism, Narration, Myth, And Tradition.*

INTRODUCTION

Modern Uzbek literature develops through the creative use of national values and folklore traditions. In the field of literature, there are new studies devoted to the study of the influence of folklore on written literature. Researchers of the new era are increasingly striving to find the root causes of the charm and charm of fiction at the basis of folk oral art. This interest requires the study of the relationship between folklore and written literature in a new direction.

Studies of the relationship between folklore and written literature, conducted by literary critics, can be divided into two groups:

1.A study of the relationship between classical literature and folklore.

2. A study of the relationship between modern literature and folklore.

The research work carried out in the framework of the study of modern literature and folklore relations was also studied in groups by literary genre: a) studies devoted to the place of folklorisms in prose works; b) research on the artistic functions of folklorisms in poetic works; c) research on the stylization of folklorisms in dramatic works.

In fact, the issue of the history and essence of the study of folklore in Uzbek literature is considered as a separate object of research. It is also possible to classify the research work done in this regard in a different way from the point of view of time. Accordingly, if we look at the research, the relationship between the works of Alisher Navoi and folklore in classical literature is more studied, and the services of the well-known Uzbek literary critic N. Mallaev in this regard are invaluable. Literary critic Alisher Navoi studied lyricism and folklore in the epic "Khamsa". N.Mallaev's researches revealed that folklore motifs played a poetic role in the poet's work. Folk books about the heroes of the epics "Khamsa" are also commented on the myths and legends about them [1. 200-300]. Alisher Navoi examines the historical basis of his epics "Farhod and Shirin" and "Layli and Majnun" and gives examples of folk tales about the heroes of the work.Influenced by folk tales and fairy tales, the poet created new epics that perfectly express the adventures of "Farhod and Shirin", "Layli and Majnun" by poetic means. Literary critic N. Mallaev studied folklore of the XV century in the works of one writer.

The Main Findings and Results

Even after independence, attention was paid to the poetic analysis of folklore elements in the works of A. Navoi. Folklore in M. Narzikulova's epic "Sab'ai Sayyar" and the interpretation of Bahrom's plot in Uzbek folklore"[2. 5-15],T.Khojaev's dissertation on "Uzbek literature and folklore of the first half of the XV century" [3. 124] covers the motifs of folklore in the works of some representatives of our classical literature and their poetic functions.

The second group of classifications includes researches of G.Jalolov, N.Karimov, G.Muminov, O.Sobirov, O.Safarov, S.Askarov, M.Omilova, H.Doniyorov and S.Mirzaev on the issues of folklore and written literature [4]. In particular, in the article by Siddiq Askarov "Some issues of folklore in the works of Abdullah Qadiri" we see that the first examples of the writer's work have already studied folklore in detail. In this article, the researcher discusses the author's drama "The Unhappy Groom", "What does Toshpolat Tajang say?" his humorous story, his masterful use of simple forms of folklore in his novels "The Bygone Days" and "The Scorpion from the Altar".These folklorisms served as a powerful means to lift the reader's spirit, to express the joy and sorrow in his heart, and to alleviate it. The people's creative attitude to man and the world, their worldview, dreams and hopes are reflected in the examples of creativity created by the people. That is why the creation he created has immortal power. The influence of folklore on the written literature requires a great deal of care on the part of one to study the matter. In the above research, the harmony between written literature and folk oral art is shown from different angles.

Reading prose works created in written literature, we see the influence of folklore in the plot of a work of art, in the system of images, in the composition of the work. The elements of folklore used in the work of each artist fulfill a certain poetic function. The influence of folklore on the written literature is observed in the works of writers of all periods. It is clear from this that folklore is a literary-aesthetic process that can have a significant impact not only on the emergence of written literature, but also on its development and prosperity.

Oral creativity, created by our people, has always in its essence defended the interests of the working people. Folklore works reflect the dreams and aspirations of our people. Folklore can also be used in all types of written literature, including drama, poetry, and prose. Elements of

folklore are important to a work of art no matter what type is involved. From a scientific and theoretical point of view, all three literary genres are influenced by folklore.

The role of folklore in our literature and how it is used by artists has attracted the attention of many literary critics to this day. O. Sabirov analyzes the prose of Abdullah Qadiri, Oybek, G.Gulam, Komil Yashin in his study "Uzbek realistic prose and folklore". During his research, O. Sobirov focuses on the speech of the heroes in the works of Abdullah Qadiri, G. Gulom, Oybek, Kamil Yashin, the elements of folklore in the plot of his works.

Literary critic Marhamat Omilova's study, "Folklore Traditions in Uzbek Soviet Literature," focuses on the works [5. 110-124]of Gafur Gulam and Askad Mukhtor. The researcher focuses on the elements of folklore in the works of G. Gulom, such as "The Resurrected Dead", "Shum bola".Literary critic Askad Mukhtor's novel "Chinor" and its folklore were also widely emphasized during his research.M.Omilova commented on the novel "Chinor" and the legends that formed it, and commented on the role of legends in the composition of the work. The researcher also noted in his article that the author managed to ensure the true nationalism and philosophical depth of the work through the creative use of folklore traditions in his work [6. 7-12].

Professor G. Muminov in his doctoral dissertation on "Folklore in modern Uzbek literature" notes that in our literature there is a growing number of ways to retell folk tales and fairy tales in a poetic way [7. 44].Although the topic of folklore is currently poorly studied in dramatic works, G. Muminov in his research studies the motifs of folklore in some dramatic works. Izzat Sultan portrays the struggle of the peoples of Central Asia for freedom in the drama "The Unknown Man", which depicts the heroism of the people who fought against oppression for justice. In this drama, the playwright aims to show the participation of the people in such uprisings, using the popular story of prayer and the epic "Prayer" by Nurmat Bakhshi [8. 30].

Literary critic G. Muminov studied the role of myths and legends in the composition of works of art, their poetic function on the example of the works of poets and writers from the early twentieth century to the years of independence.

Literary critic D.Kuvvatova studied folklore traditions in Uzbek science fiction and studied folklore motifs in Uzbek fiction as an object [9.80 110]. Literary critic A. Ergashev in his research studied narrations from folklore motifs [10. 13-62]. His study, The Legend and Its Role in the Compositional Structure of a Fiction, provides a scientific basis for the narrative and its poetic function in the composition of a work of art, and the relationship between the narrative and the plot of a work of art.

M.Imamkarimova examines folklore motifs in the works of the writer in her research "National values in the works of Utkir Hoshimov" [11. 54-98]. In doing so, the researcher focused more on ethno-folklore and its role in the plot of the work of art.

In his research, Sh. Suleymanov conducted research on the expression of folklore motifs in detective stories. In his scientific work "The role of folk traditions in Uzbek detective prose" the researcher studies the motives of folklore at the heart of detective works in Uzbek literature. The object of research is the works of such writers as Olmas Umarbekov, Omon Mukhtor, Tohir Malik, F. Kilichev, M. Saibov, who created relatively perfect examples of Uzbek detective prose.

The literary critic first divides the detective works into two and examines the folklore motifs in the prose of the above creators [12. 70-115].

Sh. Doniyorova in the dissertation "Artistic and methodological peculiarities of Shukur Kholmirzaev's stories" [13. 30-128] the local calorie is in terms of the hero's uniqueness as well as national character and style aspects,the scientist studied the stories of Sh. Kholmirzaev "Freedom", "Man who flew into the abyss", "Old man", "Fatherland" and many others. These stories explore the national spirit and national character of the Uzbek people. Studying the stories of the writer, the researcher explores the places where the heroes lived, their national characteristics and signs, images of the customs of the people to which they belong.

Literary critic Mominjon Khalilov in his article "The role of folklore in the development of our prose" focuses on the works of Abdullah Qadiri in a humorous direction. From the author's "Kalvak Makhzum's memoir", "What does Toshpolat tajang say?" such as satirical works. The comic situation in G. Gulom's story "Shum bola" is also analyzed in this article.The article explores the tendency of the researcher to refer to the genre of folklore in our prose, the legends of devotion and duty used in the works of Olmas Umarbekov "My love", "It is difficult to be a man." The morning star in Hoshimov's story "Desert Air" is illustrated by the legends about the Konkus river in "Spring does not return".

Folklore has been the basis for the creation of rare examples of written literature for centuries. There is an artist who truly feels artistic creativity, and people use their oral creativity to ensure the eternity of their creativity.

Folklore and written literature are always in contact with each other. Folklore has served as an inexhaustible treasure for literature of all times. Many fairy tales, proverbs, legends, anecdotes, legends based on folklore formed the basis of works of art created in written literature.

Reflecting in art traditions, rituals, national values, joys and sorrows of their compatriots, creative people strengthen in the hearts of the younger generation respect for the past and the homeland of their ancestors. If the younger generation is brought up in the spirit of love for the national heritage created by their ancestors, for the centuries-old traditions of their ancestors, it is natural that they are inspired by national traditions and rituals and strive for creativity, development and prosperity.

The author Sabir Onar's work "Bibisora" observes and analyzes a number of Uzbek traditions. The day after the wedding of Suyundik and Tolgonoy, one of the heroes of the work, there will be a "Yuz Ochar" ceremony. According to this ceremony, the boy, who had not yet reached the age of prayer, would open the bride's face with a fat spoon. "At the insistence of the women, I poured half a bucket of oil into the burning fire on the plane. Otherwise, the bride will have fat legs. The bride will bring blessings to this house" [14. 13].The above ceremony has been preserved by our grandmothers for many generations. When we generalize such ethno-folklorisms used in prose, their function for the plot of the work of art is as follows: a) reveal the character of the protagonist in the work; b) embodying the portraits of images in the eyes of the reader; c) to show that the protagonist is connected with society and social life; d) to reflect the aesthetic views of the protagonists of the work on social life and their spiritual world; e) to be able to see the art of the work realistically and feel it from the inside.

The narration of the writer Nazar Eshanqul in “The Son of the Gorge or the Water of Life” belongs to the complex form of folklore and belongs to the analytical type. The legend is about a saint who is narrated by the uncle of the protagonist of the work. “Analytical folklore has been used as a literary factor in the Mayan episode to reveal its inner dramatic collections in the spirit of the protagonist” [15. 50]. Through the legend of the “Saint”, the creator tries to reveal the inner college in the psyche of the protagonist. This narration is only used to reveal the psyche of the protagonist.

CONCLUSION

Throughout the literary process of all times, the study of the relationship between written literature and folklore has been an important topic of literary criticism. The influence of folklore comprehensively enriches written literature. In addition, the work served to further reveal the character of the main characters, to fill in the lines characteristic of the portrait of the main character.

Folklore is the spiritual heritage of our people. It serves as a fountain for works created in each period.

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DEVELOPMENT OF FACTORING IN THE WORLD AND METHODS OF THEIR APPLICATION IN UZBEKISTAN

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ABSTRACT

In this article, the world practice of using factoring in different countries was considered. Pros and cons of introducing factoring using statistical data.Based on them, ways to solve these problems were given, as well as the application of factoring in the Republic of Uzbekistan, taking into account world practice.

KEYWORDS: *Factor, Factoring, Commercial Banks, Factoring Companies, Business Entities, Accounts Receivable.*

INTRODUCTION

Factoring is widespread in many countries as one of the most important sources of external financing of business entities, the convenience of which is well perceived from their sides. In particular, the fact that the funds financed directly depend on the total amount of accounts receivable and not in the form of loans, this opens up the possibility for them to replenish working capital and ensure the turnover of working capital for business entities. In general, despite the fact that the global economy and the financial situation have lagged far behind due to the pandemic, factoring indicators remain unchanged. So, factoring is a financial instrument and a complex financial product provided by a factor (commercial bank) to a supplier client in exchange for the assignment (sale) of receivables, which includes supplier financing, administrative management, debt collection, as well as elements of information, insurance, accounting, legal, and other services.

According to SuzanaBaresa, Sinisa Bogdan [1], in general, between 2004 and 2010, the factoring rate between countries (with the exception of a slight decrease in 2008) showed growth rates, especially in 2010, when domestic factoring increased by 20%, and external factoring by 34%.

According to a World Bank study on factoring in a number of European countries, the share of factoring operations in relation to GDP is directly related to the recognition of the type of financial services in legislation. According to Marie H.R Bakker et al., [2] ... in many countries, the overall share of the factoring market size relative to GDP is relatively high. For example, in Italy, Great Britain and Portugal, this figure is 12-15%. In Germany it is 3%. In general, economists at the international level analyzed factoring legislation and came to the following

conclusion ... in countries where legislation and control over factoring are strict, the development of factoring is at a low level.

According to the director of the Department of Trade Finance of the Moscow Credit Bank, N. Bakhova [3] ... during the pandemic, a sharp increase in demand for telecommunications equipment from abroad, preventing the risk of late arrival of products, led to a sharp increase in demand for factoring. According to I. Lysenko, Director General of "Sber Factoring" [3], in the context of a pandemic, international factoring practice does not allow exporters to pay for non-resident products and becomes one of the reliable sources of its financing. However, for importers (suppliers), this is one of the ways to optimize accounts with non-residents and extend payment terms.

ANALYSIS

The current form of factoring originated in Great Britain in the XIII century and became a common type of financial service in the development of trade between its colonies. The UK is currently the world leader in factoring turnover, as evidenced by the fact that the annual turnover of factoring averages 325 billion euros, accounting for 12-15% of GDP, of which 300 billion. Euros are internal factoring operations. (See Table 1.) The share of factoring in commercial banks is 93%, and the remaining 7% are factoring companies. Providing a wide range of factoring services, where many large commercial banks have opened their subsidiary factoring companies, including Royal Bank of Scotland and Lloyds TSB, etc. In the UK in 1999, more than 24 thousand economic entities used factoring, which employed more than 500 thousand workers. [4]

***TABLE 1. DYNAMICS OF FACTORING GROWTH IN EUROPEAN COUNTRIES BY YEARS. MILLION EUROS* [5]**

Europe	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2019-20 ratios in %,**
Bulgaria	300	450	340	550	1010	1500	1600	1728	1820	1947	2919	3211	3532	3300	107
Croatia	1100	2100	2450	2793	2269	2269	3146	2498	2885	2825	1340	1094	1140	1132	101
Hungary	3100	3200	2520	3339	2817	2676	2661	2827	3779	3635	5730	6911	8550	8820	97
Poland	79000	78000	120000	162610	179000	245010	315888	334097	350020	393096	443000	56474	66141	62864	105
Romania	1300	1650	1400	1800	2582	2920	2713	2700	3651	4037	4560	5007	4854	5023	97
Russia	131000	16150	8580	12163	21174	35176	41960	29170	23332	28004	33792	43840	45125	42302	107
Slovakia	1380	1600	1130	981	1171	1024	1068	1036	1036	1646	2646	2521	2032	1604	127
Great Britain	286	188	196	226	268	291	308	350	376	327	324	320	329	273	121

After the collapse of the Soviet Union in 1991, the countries of Eastern Europe (Poland, Czech Republic, Hungary, Romania, Bulgaria, Slovakia, Slovenia) quickly moved from a planned economy to market mechanisms. Of course, this transformation process was not easy. It caused a shock in the economy, a decline in production, unemployment, and other problems. But the countries of Eastern Europe quickly overcame these difficulties and managed in a short time to achieve the economic indicators of their Western partners, which they have achieved for many years. The main driver that made a great contribution to the development of Eastern European countries was the inflow of foreign direct investment. If you look at the figures, only from 1990 to 2008 did Poland receive 111 billion dollars, the Czech Republic-75 billion dollars, Romania-58 billion dollars, and Hungary, 52 billion dollars [6]. Undoubtedly, this economic growth has also influenced the development of factoring. (Table 1). In recent years, Poland has been ahead of not only Eastern European countries in the development of factoring, but also developed European countries. The average growth of factoring is 8% of GDP. This is 248,701 million Polish zloty (55,638 million euros). (Table 1)

In Poland, factoring is considered as an alternative to credit services. This leads to a reduction in overdue debt with prolonged financing of accounts receivable. In turn, debt management leads to an increase in the liquidity of economic entities. It is for these reasons that, unlike in other European countries, factoring is widespread in Poland. In the Polish Civil Code, factoring is not part of banking services, therefore the Central Bank of Poland does not control factoring operations, but the factoring market is regulated by the norms of the International Convention [1] (UNIDRUA) [7].

In Poland, internal factoring is well developed, accounting for 80% of the entire market. As a result of our research, it turned out that the practice of factoring without recourse is mainly developed in Poland. In the Polish factoring market, customers (suppliers) risk non-payment of receivables and try to conclude factoring agreements with factoring companies or commercial banks, mainly agreements without recourse. The main reasons for factoring without recourse are: the risk that in practice falls on the factoring company (commercial bank). That is, after the factor finances the supplier, the accounts receivable that will appear between them and the fact of non-receipt of these funds from the buyer is very large, and in the case of factoring without the right of recourse, commercial banks bear all the risks. In other countries of the European Union, it's all the opposite, that is, the financial risk arising in the factoring process will rely mainly on the client (supplier) of the factoring company (commercial banks). You can see this comparison in the table below. (Table.1)

2. TABLE. COMPARATIVE TABLE OF THE SHARE OF FACTORING IN POLAND AND THE EUROPEAN UNION IN 2014-2015 [1]

Indicators	Poland (billion. euros)				European Union (billion. euros)			
	2014		2015		2014		2015	
Total factoring	34	Share in %	35	Share in %	1462	Share in %	1557	Share in %
Domestic factoring	30	86,93	28	87,79	1214	89,59	1263	80,83
Non-recoursefactoring	17	57,64	14,84	53,64	497	41,19	282	54,25
Recoursefactoring	13	42,32	13,6	41,06	715	58,81	798	45,75
International factoring	4	13,07	7	12,79	247	18,41	293	19,17

In Poland, factoring companies widely use the practice of insurance when acquiring and financing the rights of receivables. The above factors led to the development of factoring without the right of recourse. In conclusion, we can say that the practice of factoring without the right of recourse is suitable for business entities that are financially stable. According to the Polish Factoring Association, before the 2008 financial crisis, commercial banks dominated factoring operations in Poland. However, by 2020, the number of non-bank credit organizations practicing factoring will have doubled to 43 companies. [7]

According to the Central Statistical Office of Poland, 90% of economic entities that use factoring are small and medium-sized businesses with an average turnover of 1 billion rubles. zloty (approximately $257 million)

Undoubtedly, an important factor is the study of foreign experience in the development of factoring and its application in the factoring market of our country. Foreign experience of factoring in our republic would make a significant contribution to the development of factoring, as well as the elimination of existing factoring problems. In this regard, it is best to study the experience of the Russian factoring market. Since they are historically separated from one system, economic, spiritual, and social proximity also play an important role in the application of these factors. Currently, the factoring market in Russia is developing rapidly. Largely due to the ratification of the International Convention (UNIDRUA) in 2014. [8] and the inclusion in the Civil Code of a separate chapter on factoring in 2018, entitled "Financing in exchange for the waiver of a monetary claim in favor of another person" [9], which is one of the key factors in the regulatory framework of the Russian Federation. Even with the introduction of economic sanctions in 2014, as well as a sharp drop in prices in the world market for oil and gas (the price of 1 barrel of oil fell from $107 to $25 per barrel in 2014), could not have a big impact.

The volume of factoring operations in the Russian Federation continues to grow. Although there was a decrease in export-import operations in 2020 due to the impact of the pandemic, this factor did not have a significant impact on factoring operations. For example, in 2019, the volume of international factoring operations amounted to 21.2 billion. In 2020, it will double to 40 billion. (600 million US dollars) and will triple to 60 billion by 2021.RUB (approximately $810 million) [3]

Although international factoring in Russia began to develop on a large scale starting in 2018, it is much lower than in other developing countries. For example, in many developed and developing countries, the share of international factoring is 15% of the total volume of factoring, and in Russia it is only 1%. In the context of the pandemic, the remote work of economic entities led to the extension of their payment contracts, which led to an increase in accounts payable and receivables between enterprises and organizations. This factor has led to an increase in demand and interest in factoring in business entities. In 2020 alone, factoring funding increased by 24%, and their portfolio increased by 37% to 1.1 trillion rubles ($14.670 billion). [11]

RESULTS AND DISCUSSIONS

Germany is one of the leading developed countries in the world, but the practice of factoring is not sufficiently developed. As a result of our research, it turned out that until recent years, there were legal restrictions on the implementation of factoring in Germany. In the legislation of the Federal Republic of Germany, factoring is understood as a contract of sale, a debt obligation arising in the process of selling goods or services. If banks specialize in providing factoring services, they must obtain an additional license in accordance with the provisions of German credit legislation in addition to the banking license. This means setting an additional limit for commercial banks to perform factoring operations. Taking into account the practice of applying factoring in Germany, we conclude that the legislation regulates factoring activities so

thoroughly, and this hinders the development of factoring in those countries that are not mediocre.

Factoring in the UK is developing at a high level. What is the reason for this?

Firstly, the practice of factoring is not regulated by the state. In English law, factoring operations are understood to mean the refusal of unpaid debt claims in favor of another person between the parties (supplier, buyer, factoring company or commercial bank) arising as a result of commercial credit, accounting, information, insurance, legal and other services for the sale of goods and services. Thus, factoring activities are carried out within the framework of general civil law regulating the activities of economic entities and do not require a special permit (license). In addition, British banks, insurance companies and other financial institutions can carry out factoring operations on the basis of existing permits to carry out factoring operations as part of their activities.

Secondly, accounts receivable management. For example, if a company has 3-5 debtors, there will be no problems with debt management, and even one employee will be able to control it. However, if the number of clients is in the thousands, then this will lead to a significant increase in management costs. Analyzing the growing market, British companies have come to the conclusion that it is not necessary to have a large number of employees to collect and control debt, since a factoring company (commercial banks) will make it all much easier.

Thirdly, the culture of risk insurance. An important feature of factoring is that it is a set of services that covers not only the financing of working capital, but also the risks of default by debtors. The British prefer to ensure their financial risks, even in small amounts, then to suddenly lose the entire amount. That is, factoring operations in the UK are permanently insured.

Fourth, popularization of factoring. In the UK in the 70s and 80s, constant and persistent work was carried out to provide extensive information about factoring and improve the image of factoring, and this has borne fruit. Gradually, factoring companies were formed in society, not as an extreme measure of financing economic entities, but as a convenient and effective financial tool for business development.

Currently, commercial banks in Uzbekistan use factoring without recourse, mainly for clients who have been considered reliable customers of the bank for many years. Commercial banks in the Republic of Uzbekistan are not interested in attracting representatives of small and medium-sized businesses to use factoring. Even if they apply to commercial banks for financing for factoring, they are rejected by the banks because they are skeptical about the financial condition of most of them. In world practice, one of the "golden rules" of factoring is the financing of small and medium-sized businesses. After all, factoring is a convenient type of financial service for small and medium-sized businesses in all respects. In our opinion, if the Government applies sufficient measures for the development of factoring (regulatory) and commercial banks, will contribute to the development of factoring among small and medium-sized businesses, it is not only the development of this type of financial services, but also the development of other sectors of the economy through the circulation of working capital.

Above, we studied the development of factoring without recourse in Poland and its relationship with the European Union in 2014-2015, studying the above hypothesis at the moment and to answer the question: we compared the same table, that is, the turnover of factoring in Poland and in the EU for 2019-2020. In our opinion, over the past five years, the ratio of factoring without the right of recourse in the EU has also developed. (Table 3)

TABLE 3 COMPARATIVE TABLE OF THE SHARE OF FACTORING IN POLAND AND THE EUROPEAN UNION IN 2019-2020 [5]

Indicators	Poland (billion euros)	European Union (billion euros)

	2019		2020		2019		2020	
Total factoring	66	Share in %	63	Share in %	1976	Share in %	1844	Share in %
Domestic factoring	55	83.3	52	82.5	1592	80.6	1483	80.4
Non-recoursefactoring	33	60	28	54	400	51	300	47
Recoursefactoring	19	40	17	46	200	18	100	16
International factoring	11	16.7	11	17.5	383	19.4	361	19.6

The development of the factoring market in Russia is one of the leading among the CIS and Eastern European countries. (Table 1)

In our opinion, there are several reasons why the growth dynamics of the factoring market in Russia has not changed even during the economic downturn (2014-2016):

Firstly, the adoption of regulatory legal acts on factoring (ratification of the UNIDRUA International Convention);

Secondly, the suspension of the provision of low-interest and short-term loans from foreign banks due to economic sanctions has increased the demand for factoring services in the domestic market as an alternative source of financing;

Thirdly, the transition of factoring contracts to an electronic format;

Last but not least, the gap in interest rates between commercial bank loans and factoring interest rates has decreased over the years from 10% to 6% in 2019. [11]

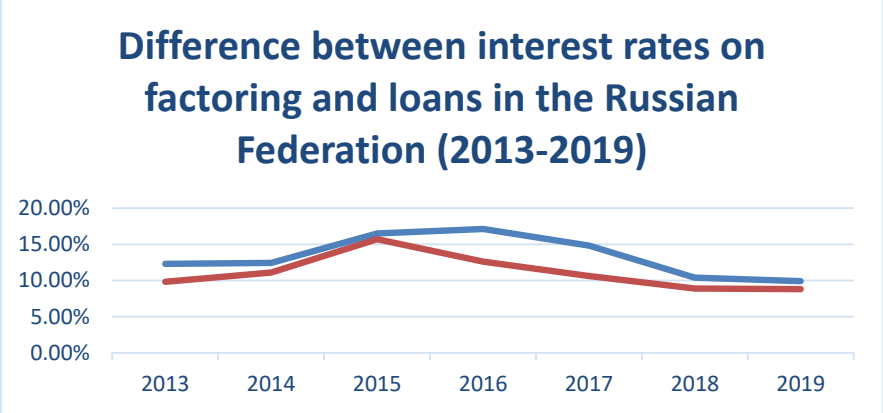

Figure Difference between interest rates on factoring and loans in the Russian Federation (2013-2019). [12]

CONCLUSION

In the international practice of factoring, no country can compare with another in terms of the volume of factoring operations. After all, the way each state adopts the practice of factoring in its own legislation may have a positive or negative impact on the development of factoring.

As mentioned above, the current development of factoring in the UK is a financial architecture built on four pillars. To the question of factoring influencing its development in one of the developed countries of the world and is it possible to get a model of its direct development in the factoring market of Uzbekistan!? According to article 750 of the Civil Code of the Republic of

Uzbekistan, in practice, a license is required for factoring in Uzbekistan. However, after the repeal of the Regulation "On the procedure for conducting factoring operations by commercial banks on the territory of the Republic of Uzbekistan" by Order of the Ministry of Justice of the Republic of Uzbekistan No. 3293 dated March 31, 2021, in our opinion, it opened up wide opportunities for commercial banks and factoring companies.

Secondly, in our opinion, it would be advisable for the implementation and management of factoring operations to be provided only by the parties of factoring companies or commercial banks. In addition, if factoring operations were performed on digital information devices, this would further contribute to the development of factoring.

Fourth, in our republic, as in the UK, large-scale work should be carried out, the promotion of factoring among economic entities. In our opinion, since many business entities currently have no idea about factoring, it is more convenient for them to get a loan from a commercial bank than to give the right to receivables to commercial banks and get a quick loan. In order to ensure the convenience and opportunities of factoring practice for business representatives in our country, commercial banks need to carry out the following work:

* Disseminating information about factors and broad advertising in the media and among the general public;

*Meeting directly at the location of a large business and informing them about the convenience of factoring;

* Provision of factoring information to clients via the official website, mobile application, and commercial bank offices;

*Comprehensive retraining of bank employees for factoring operations

In conclusion, we note the convenience of factoring, especially the rapid adaptation to changing market conditions, the fact that factoring is stable in the world during the current pandemic: our country has great potential for factoring operations. However, it is necessary to make greater use of these opportunities—to eliminate existing regulatory and legislative barriers to factoring operations and financing, and to further increase the prestige of international factoring in order to make it more acceptable.

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DRONE TECHNOLOGY IN THE MINING INDUSTRY: A COMPREHENSIVE REVIEW

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ABSTRACT

Drones have been employed for a range of civilian and military purposes and tasks, including unmanned air vehicles (UAVs) and micro air vehicles (MAVs). Depending on the kind of operation, these unmanned aircraft systems may carry a variety of sensors, including acoustic, optical, chemical, and biological sensors. The purpose of this article is to give a thorough overview of drone technology and its applications in the mining sector. Drones have sparked increasing interest in the mining sector for regular tasks. 3D mapping of the mining environment, ore control, rock discontinuities mapping, post blast rock fragmentation measures, and tailing stability monitoring are just a few of the uses available. The article provides an overview of commercially available drone types, specs, and uses for mining applications. Finally, the research requirements for developing and deploying drones for underground mining applications are addressed.

KEYWORDS:*Abandoned Mining, Drones, Remote Sensing, Surface Mining, Underground Mining.*

INTRODUCTION

Researchers have concentrated on the design optimization of drones to improve the performance and efficiency of drones, which has resulted in the creation and manufacturing of different kinds of aerial vehicles with varied capacities. Aerial vehicles have been used for industrial purposes since the nineteenth century. Balloons were employed to capture photographs for distant sensing applications around 1860. Pigeons equipped with a breast-mounted aerial camera were employed for photography in 1903. Aerial torpedoes, which are considered the forerunners of drones, were created at the start of World War I. Academic and industrial groups across the globe have been paying more attention to research and development of unmanned aerial vehicles in recent years. Drones are categorized in a variety of ways depending on their configurations and the purpose they are serving. Fixed-wing, flapping-wing, rotary-wing, tilt-rotor, ducted fan, helicopter, ornithopter, and unusual kinds are among the nine categories of drones [1][2].

Drones offer a wide range of capabilities that may be used in both military and civilian applications. Drones have been integrated into civic activities as a consequence of these

capabilities and the need for unmanned technology. New unmanned aerial vehicles are being developed to help achieve this goal, and they can conduct a range of tasks in a number of situations. Drones are used in a wide variety of civilian applications, including search and rescue, surveillance, firefighting, weather monitoring, surveying, power infrastructure monitoring, and urban planning and management, to name a few. Drones have also been used for ecological and environmental monitoring, species distribution modeling, population ecology, and ecological monitoring and conservation. Drones are also used in archeology and cultural heritage, human and social understanding, personal and business drones for photography and videography, and even delivery services [3].

Unmanned aerial systems have also been utilized effectively in a variety of sectors, including agriculture, oil and gas, construction, environmental protection, mining, and so forth. Drones have recently piqued the mining industry's interest for routine operations in both surface and underground mines [4]. The goal of this research is to look at how drone technology is being used in the mining sector. Previous research and information from businesses that offer drones to the mining industry are investigated for this aim. The use of drones in surface and subsurface mines is discussed in this article. Drones' use in abandoned surface and subterranean mines is also discussed. In addition, the most frequently utilized sensors on mining drones are discussed. The difficulties of utilizing drone technology in deep mines are addressed, as well as possible solutions. The use of drones in mining operations has two major benefits. Drones outfitted with various kinds of sensors, for example, may perform a rapid examination of an area in an emergency or to identify hazards [5]. Second, drones may be used to examine and unclog clogged box-holes and ore-passes. Drones may also be used to check blockages, deliver explosives, and transport packages. Mines are often found in large, isolated mountainous regions. As a result, monitoring mines and related infrastructures is a difficult job that requires a large amount of personnel. As a result, conventional techniques of monitoring mines are time and expense intensive.

Drones may be useful in monitoring, surveying, and mapping the area around mines if used correctly. Drones may be used to monitor mine operations and topographical changes in the mining region, which can lead to mine planning and safety guidelines. A drone equipped with a hyperspectral frame camera was utilized to monitor the safety of the production pit in, for example. In open-pit mines, slope angle optimization is critical for lowering production costs, increasing mining efficiency, and recycling resources[6].

Monitoring point displacement and 3D mapping of open-pit slope zones using a combination of terrestrial laser scanning and drone photogrammetry. They also kept track of mine inventories and developments in the mining area. Collecting geotechnical data from difficult or impossible to access regions is one of the mining industry's biggest challenges. In addition, terrestrial LiDAR technology could be used to map discontinuity for slope stability. Due to the small scan angle of LiDAR technology, however, “shadow zones” or gaps in data are frequently produced[7]. Drones, on the other hand, can be used to take photos and make measurements by analyzing overlapping photographs. Using drones to conduct a topographical survey in an open-pit mine to determine the direction of discontinuity on the surface of a rock slope. Another challenge in the mining industry is determining the site's engineering geology.

Engineering geology entails the mapping of outcrops, strikes, dips, feature notation, and names, all of which contribute to the site's characterization. Outcrops can be photographed in detail by drones. However, most of the time, the results must be double-checked using a human survey. New image processing algorithms allow for the identification of rock types, strike, faults, and dips, reducing manual labor significantly. Blasting is one of the activities that is commonly repeated in the mining industry. Drones could be used to inspect the safety risks associated with blasting. Rock type, geology, topography, geometry, borehole location, and other parameters that

can be controlled by drones are important in blasting design. In addition, using drones in blasting operations provides new low-cost data. Drones were employed to examine the size of rock blocks before and after blasting[8]. Drones were also used to monitor dust particles following blasting operations in an open-pit mine in another instance. Furthermore, dust particles from mining operations and tailings have a major environmental impact on the ecosystem around mine sites, which may be mitigated by monitoring and regulating mine and tailings moisture. Mining is a labor-intensive activity that requires large expenditures to guarantee worker safety and avoid stockpile pilferage. Mining firms are always looking for innovative ways to save costs and boost production, profitability, and worker safety[9].

This may be accomplished if mining activities are meticulously planned, assets are routinely examined, and the mining site is constantly monitored. Traditional techniques, on the other hand, are insufficient to comply with increasingly severe environmental and labor laws. Drones have a variety of uses in mining, including mine surveys, inventory management, stockpile estimate, and hot spot identification, among others. Drones may be used to scan mine sites and give comprehensive information about them before beginning mining operations, as well as to record their progress so that changes in the site can be seen over time. Drones can access hazardous, hard-to-reach locations to provide improved mining planning information. Drones may be used in coal mines to identify hot spots in coal stockpiles, allowing people to evaluate possible spontaneous combustion regions and take preventative actions. Watershed management, blast planning, haul-route surface improvement, and emergency response may all benefit from drones[10].

DISCUSSION

Thermal sensors on drones are used to record variations in the spatial and temporal surface moisture content of iron mine tailings in the study. Analyzing the connection between moisture content and mine tailings management, on the other hand, may be beneficial to mine tailings management. Drones can help with automation in the mining sector by delivering visual and other kinds of sensor data. Drones, with their excellent maneuverability and low cost and maintenance, can provide a significant benefit to the mine by surveying large areas in a short period of time, as opposed to traditional methods that rely on human labor. They can provide necessary information in areas where there are health and safety risks, such as on slopes or in unstable cavities. As a result, mines are now a safer place to work than they were previously.

A drone to fly over an abandoned mine in South Africa in order to reopen it. The drone's financial worth was determined, as well as its sensitivity and risk. The drone used was able to photograph the entire targeted mine, including images of damage and infrastructure. Drone technology was used at the University of Queensland to investigate the characterization of blasting plumes. Drones could accurately detect blast plumes to a concentration of 1 mg/m3. The data from the air quality sensor and the autopilot were combined to provide an airborne particles characterization in time and space that had previously been unavailable without the use of a drone. The most difficult aspect of this study was deciding which sensor to use for dust monitoring with drones. In an open-pit mine, a drone was utilized to assess fracture orientation. There were three major stages to this study. The drone first photographed the fractures. Second, using structure from motion (SFM) software, a three-dimensional (3D) point cloud was created (a point cloud is a collection of data points in space).

Third, in order to predict fracture orientation in an open-pit mine, an image processing method was developed. They utilized an Aeryon Scout multirotor drone to carry a 100-gram camera for video and picture capture. In 2013, a three-dimensional point cloud of the surface mine was obtained using the Aeryon Scout drone. The battery was placed on top of the drone in this study, while the payload was placed at the bottom. The drone had GPS, a sonar system for altitudes

greater than 2 to 4 meters, a pressure altimeter for range altitudes that sonar couldn't properly support, a temperature sensor, a three-axial magnetometer, and a three-axis gyroscope for navigation. Data was collected and kept in internal storage, ready to be retrieved once the operation was completed. The altitude, speed, location (latitude and longitude), and camera orientation (pitch and yaw) are all recorded in the log file generated by this drone. A radio modem with a range of 3 kilometers was used to link the Aeryon Scout drone to the base station. A multi hop emergency communication system was proposed in to aid miners and rescue teams in emergency situations while also increasing mining productivity. The plan was to utilize a drone as a wireless communication framework called Sky Help to monitor mining activities and assist with search and rescue operations in deep open-pit mines. To evaluate the concept, MATLAB was used to run a simulation. There are several marketed drones that have been used by businesses for surface mining applications, in addition to the studies and testing carried out by researchers in the use of drones in mining sectors. Sense Fly is a Parrot Group commercial drone company. This company creates both the hardware and software for collecting and analyzing aerial data with drones. The following is a list of Snesefly's general specifications. Inventory tracking (calculating stockpile volumes, site surveying), traffic management (haul roads, loading floors, and stockpile location optimization, blast planning), water management (accurate management of tailing dams, watersheds, drainage basins assessment, and mapping the potential flow of water base on-site current topography), and collaboration (improving operational efficiency) are some of the applications of the Sense Fly drone.

The business is a commercial drone cloud software platform that is particularly compatible with DJI drones. For a number of sectors, including mining, this firm offers software for aerial data processing by drones. The program can create a 3D model of the region, a contour line map, an oil mine inspection, and a volume estimate for stockpiles. Drone Deploy claims to have mapped and analyzed more than 30 million acres in over 160 nations, and the company provides both drone hardware and software for use in the mining sector. The Kespry Company's drone properties. Kespry Company provides services to the mining sector such as monitoring waste-rock and ore stockpile inventories, producing cut-and-fill reports for dragline operations, assessing slope stability on active high-walls, reclamation planning, and verifying blasting pattern sites. The Kespry 2s drone produces images with a resolution of 0.5 cm per pixel. Due to the short flight time of multirotor, Kespry equipped the drone with a field swappable battery. This drone's obstacle avoidance is about (50 m) forward-facing, thanks to its LiDAR sensor. Propeller Aero develops software for aerial data analysis and collects aerial data with a customized DJI Phantom 4 Pro (P4P) drone. Propeller Aero's DJI drones have the following characteristics. Track the status of the mine, volume measurement tools for stockpile and pit volumes, plan blasting and extraction, monitor protected areas and avoid environmental fines, track progress against design, safety inspection, and keeping haul road grades consistent are just a few of the services provided by the Propeller Aero package for the mining industry.

The Phantom 4 RTK can capture high-quality images with total vector distortion of (2.1 cm). Using multiple independent checkpoints across the site, the propeller drone demonstrates accuracy of 3 cm or less. Quest UAV develops software for aerial data analysis and collects aerial data with fixed-wing drones. Table 4 shows the properties of the Quest UAV drone. These drones can help with a variety of tasks in a mining operation. Over areas, the drone has a 3.2 cm accuracy. Due to the difficulty of landing fixed-wing drones, Quest UAV uses a parachute to ensure a safe landing. In addition, you can launch by hand, using a specially designed air dock, or using a zip line. In addition, Quest UAV drones can be outfitted with a variety of payloads. A multirotor drone for aerial data collection, a site base station that uses GPS and GNSS to collect accurate coordinates, and data management software. Sky catches developed the Explore-1 drone, which is based on the DJI Matrice M100 drone and produced by DJI.

The Explore-1 drone's general characteristics. With the help of Sky catch drone data, Komatsu attempted to make the earthwork machine autonomous. To find patterns and improve data outputs, they used machine learning and deep learning. Priories was one of the first companies to provide mining companies with aerial data. This company makes both drone hardware and software for aerial data collection and analysis. The following diagram depicts the general characteristics of Prioria goods. Aerial imagery, mapping, stockpile volume calculation, and pipeline and utility inspections are all performed by these products. This company's fixed-wing drones are tube-launched and hand-launched. The vertical volume calculation precision is 4 cm, and the ground sampling distance precision is 1.4 cm. 3D Robotics makes aerial data analysis software that is compatible with Yuneec and DJI drones. The general specifications of 3D Robotics drones. Geo-referenced maps and point clouds for mineral exploration, calculating the volumes of individual stockpiles, tracking inventory over time by calculating the volumes of individual stockpiles in every flight, improving site planning and coordination by pre- and post-blast surveys, mitigating project risk, and remote access to mine information are all services provided by 3D Robotics aerial scan. Land surveying, construction, agriculture, transportation, telecommunications, asset tracking, mapping, utilities, mobile resource management, and government are among the sectors for which Trimble Company offers positioning technology. However, recently, this company applied drone technology for aerial data collection and analysis. The technical specifications of this company's multirotor drones. The Trimble drones can provide boundary and topographic surveys, survey-grade mapping, power line modeling, field leveling, site, and route planning, progress monitoring, as-built surveys, resource mapping, disaster analyses, volume determinations, topographic contours, 3D surface models, and ortho photographs for mining industry.

Precision-hawk software for aerial data analysis and uses other company’s drones for aerial data collection. The specifics of DJI multirotor drones and birds-eye-view fixed-wing drone, which is used by Precision-hawk Company. The software of this company provides the volume measurement tools for the pit, stockpile, and similar structure for the mining industry. In addition, outputs of the software could be useful in monitoring, planning, reports, safety and compliance, oversight, and reclamation. This company uses various kinds of sensors on the drones for aerial data collection. Sensors, such as thermal for tracking the relative temperature of the land and objects, multispectral for capturing near-infrared radiation and ultraviolet light which is invisible to human eyes, hyperspectral for identifying minerals, vegetation and other materials, LiDAR for collecting high-quality evaluation of natural and human-made objects, visual for capturing high-resolution aerial images, and video for live streaming and capturing video to on the ground devices can be integrated into the drones .

Pix4d uses images taken by drones, hand, or plane for data analysis by using the photogrammetry method. The software of this company is compatible with a variety of drone company products including DJI, Parrot, and 3DR. The services for the mining industry by Pix4d Software Company are as follows: (1) supporting blasting operations by locating boreholes, (2) monitoring blast sites without putting people in danger, (3) measuring stockpile volumes and excavated materials, (4) Pit mapping, and (5) toxic tailing dam mapping. It has been claimed that drone mapping could be performed in 20 percent of the traditional mapping method time, without disrupting traffic. Micro drones produce both drone’s hardware and software for aerial data collection and analysis. The micro drone's specifications. Drones and software in the package can map the deposit site, survey the mine, explore minerals, monitor stockpile volume, track equipment, and take time-lapse photos. Sensors such as multi-spectral, thermal, LiDAR, and methane gas detection could also be added to the drone for inspection purposes. Drone positioning is done using GPS, and data post-processing is done using aerial triangulation. For aerial data analysis and collection, this company develops both software and drone hardware.

This company's software and drone package can provide stockpile volume, pit contour maps, hazard detection, anomaly detection, and topography surveying in the field without interrupting operations. Delair Company's DT18 Mapper drone package was used by one of the largest American copper and gold mining companies to conduct weekly topographical surveys for calculating production capacity and creating digital surface models of the copper mine at Tenke fun gurume (TFM) in the Democratic Republic of Congo's Katanga Province. Drone use in underground mines has been limited despite advances in drone technology. This is due to the difficulty of using drones in underground mines. Drones flying in harsh underground environments face numerous challenges. Flying a drone in underground working areas is difficult due to confined space, reduced visibility, air velocity, dust concentration, and the lack of a wireless communication system. Furthermore, a drone operator's access to inaccessible and dangerous locations in underground mines is practically impossible. Drones in underground mines could be used for a variety of health and safety purposes. Surface roughness mapping, rock mass stability analysis, ventilation modeling, hazardous gas detection, and leakage monitoring are some of these applications.

CONCLUSION AND IMPLICATION

Recent studies and commercially developed commercial drones and services in the mining industry were reviewed in this paper. In addition, the mining industry's use of drones for search and rescue missions was discussed. Aside from that, standard remote sensing equipment placed on drones. The mining industry was examined. In surface mining, drone technology is a common tool. In surface mining, drone technology is a common tool. In comparison to typical monitoring methods, it is efficient and low-cost. Ore control, rock discontinuities mapping, 3D mapping of the mine environment, blasting management, post blast rock fragmentation measures, and tailing stability monitoring are just a few of the possibilities for drones in surface mining. Drones with fixed wings and rotary wings are the most widely utilized in the mining industry, for both research and commercial purposes. Drone uses in underground mines are relatively limited, despite major advancements in drone technology. This is owing to problems such as GPS denial, a lack of wireless signal, confined places, dust and gas concentrations, and generally harsh settings. The use of drones in underground mining has been suggested as a feasible option. Encased drones may be a solution to the environmental challenges that exist in underground mines.

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SMART CAMPUS CLOUD COMPUTING ARCHITECTURE: A SECURE AND RELIABLE SOLUTION

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ABSTRACT

The new ideas of smart computing and pervasive computing have penetrated many theoretical spaces and given birth to new concepts under the umbrella of smart environment such as smart homes, smart buildings, smart campuses, smart cities, smarter earth, and so on, driven by the implementation of modern technologies such as cloud and the opportunities provided by these to the benefit of people. The Smart Campus is a novel concept in information technology development, combining Cloud Computing, the Internet of Things, and other emerging technologies. This research paper summarizes the findings of our study into the best options for the creation of a smart campus that also ensures data security, with a particular emphasis on data confidentiality. For the cloud security architecture, our solution offers five layers of protection; it provides a high degree of security as well as strong data secrecy - the necessary backbone for a genuinely smart campus development.

KEYWORDS:*Cloud Computing, Cloud Security Architectures, Data Storage Security, Smart Campus, Steganography.*

24. INTRODUCTION

Higher education is heavily influenced by the smart environment idea. It provides ground-breaking challenges in terms of higher standards and creative methods, emphasizing the university's societal role of thought leadership and practical solutions demonstration. As a result, the university campus is an excellent location for creating a smart environment. Although the field literature does not draw a clear line between concepts such as "smart education," "smart university," and "smart campus," it does address multiple aspects of the taxonomy of these concepts in a trans- and inter-disciplinary manner, beginning with needs and benefits and progressing through features, components, technologies, systems, and architecture[1].

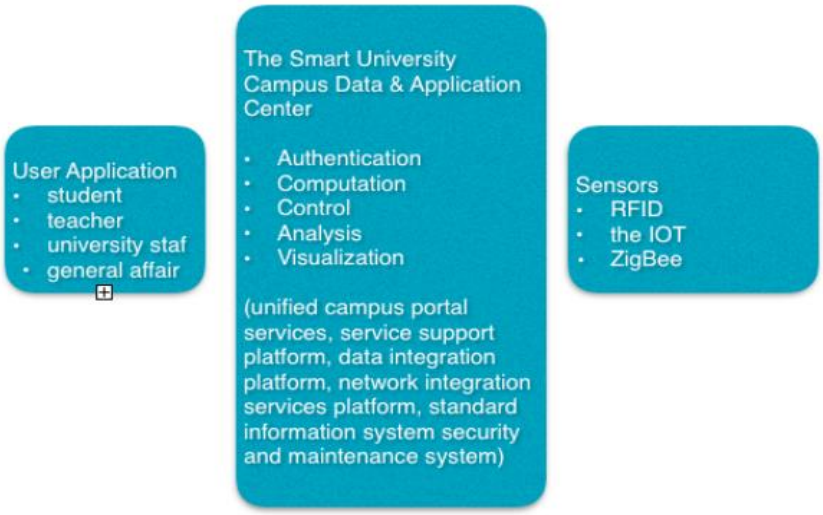

Figure 1: The architecture of the university campus within IoT[2]

The Smart campus, on the other hand, is a novel concept in the field of information technology, combining Cloud Computing, the Internet of Things, and other emerging technologies [3]. Cloud Computing, which also provides supercomputing and storage capacity, allows for a comprehensive integration of resources. The internet of things is the result of a successful integration of sensor networks, the Internet, and mobile communication networks, with the sensory system at its heart.

Figure 1 shows the architecture of a smart campus built on cloud computing and the Internet of Things, which includes unified campus portal services, service support platform, data integration platform, network integration services platform, and standard information system security and maintenance system. The cloud computing platform and its confidentiality and security needs are the subject of this article. The following is a breakdown of the paper's structure. Section 2 discusses Smart Campus Security Issues and Concerns, with an emphasis on the University of Oradea's Smart Campus. The significance of protecting the cloud computing architecture for a Smart Campus is discussed in Section 3. The suggested secured cloud computing architecture for the smart campus is presented in Section 4. It is based on the use of five levels of protection. To improve data secrecy, the top security layer employs steganography. Finally, there is a section that discusses possible enhancements to the suggested solution.

25. DISCUSSION

25.1. Smart Campus Classification and Improvement Approaches:

The concept of smart campus has evolved from a simple engineering digital campus to a hybrid of physical and digital space that includes everything from campus cards, virtual campuses, mobile platforms, datacenters, smart infrastructures, intelligent buildings, sustainable development, and energy efficient operations, among other things, to the intelligence of teaching and research, management, and serendipity. The fast growth of science and technology, such as big data, the Internet of Things, and cloud computing, as well as the formation of a global vision towards sustainability and the United Nations (UN) Sustainable Development Goals, have pushed the idea of smart campus ahead (SDGs).

The difference between "smart campus" and "smart university" has been emphasized from a technical standpoint. Smart campus models are being developed by a growing number of academics and practitioners. Because of the many parallels between university campuses and cities, Pagliaro et al. believe that the smart city concept may be expanded and modified to establish a smart campus. Planning, integration and cooperation, adaptability, and scalability are

the five pillars of their methodical approach [4]. Mattoni et al. suggested a smart campus model based on two aspects: identification of reciprocal effects across smart fields and prioritizing based on a number of variables including production timelines, integration degree, viability, stakeholder opinion, and so on [5]. The smart campus's structure is a hybrid of physical and digital space, according to Liu.

We will consider that the smart campus system combines, using IoT, the physical devices of our digital university with cloud computing and storage in our approach, thinking that the IoT Strategy and Digital Tools may help solve major problems in Higher Education. Figure 2 depicts our proposed smart campus concept. Smart Campus is a cloud computing platform that uses IoT technology to connect isolated systems such as educational management systems, financial management systems, office systems, and facilities management systems. We build an ecosystem by using the Internet of Things, which allows for the integration of data from many devices into a single platform, where analytics can assist produce actionable insights.

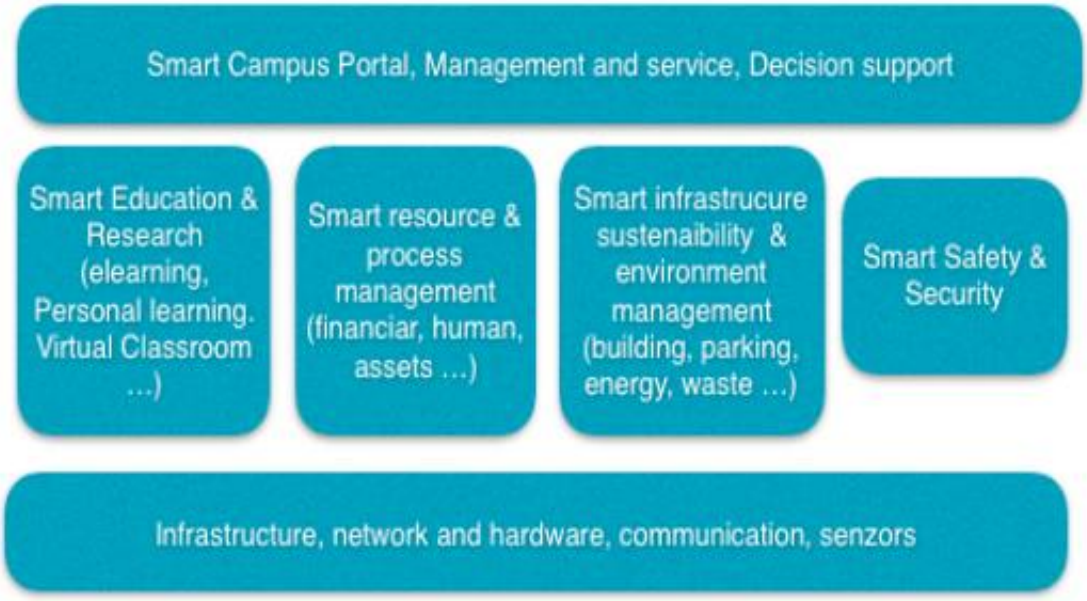

Figure 2: Illustrates the Smart Campus Model [2]

Many intelligent activities, such as social networking holistic e-learning, communication for work collaboration, green and ICT energy efficiency with intelligent sensor management systems, preventive and protective health care, intelligent buildings management with automated security control and surveillance, and visible governance and reporting, waste management, must be considered in the Smart Campus.

25.2. Significance of a Secure Cloud Design for a Smart Campus:

Regardless of the problems addressed, making the campus Wi-Fi enabled is the most critical need for it to be smart. The need for intelligent and ubiquitous devices to activate internet-based device navigation on university campuses is growing. As a result, implementing a BYOD policy for internet surfing via Wi-Fi poses a problem in terms of creating a safe navigation experience [6]. The goal of this article is to create a safe and reliable cloud computing architecture based on the separation of Internet surfing into two areas: Internet Restricted Zone (IRZ) and Internet Public Zone (IPZ).

A unified campus portal services, service support platform, information management platform, network integration services framework, and standard information system security and maintenance system are all part of a smart campus built on cloud computing architecture. Our Smart University Campus design, shown in Fig. 3, will be based on their concept. In our

approach, we assume a 4-layer Unified Portal System, with the Information Gathering Layer as the lowest layer, which is responsible for gathering data in real-time or non-real time.

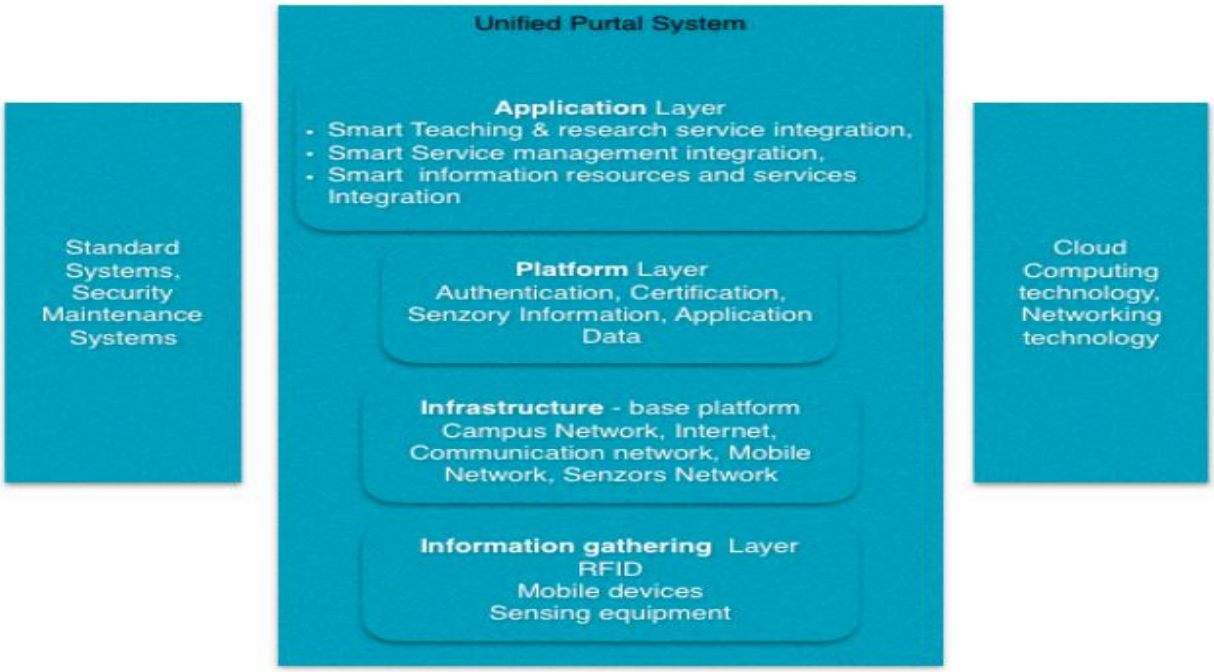

Figure 3: Smart Campus System Architecture

The smart campus, which is built on IoT and cloud computing technologies, raises a slew of problems that need to be addressed. These are linked to: top-level design flaws; the requirement for uniform data standards for RFID labels and sensors; and data protection and security issues associated with cloud computing.

The data security and data confidence for the smart university campus are the main topics of discussion in this article. In this regard, achieving a proper data classification and identifying the secret data whose confidence is critical is a critical step in building a safe, confident smart campus architecture. Our suggested architectural approach will provide an extra layer of protection for this data.

25.3. Secure Cloud Computing Architecture for a Smart Campus:

25.3.1. Cloud Security Architectures:

Cloud Computing (CC) is a valuable business tool since it is an effective method to store and manage databases. CC's services are delivered as a software as a service (SaaS), which has the benefit of being less expensive than traditional computer solutions (the price is offered on a user basis). Furthermore, effective CC usage lowers energy consumption and frees clients from IT installation and maintenance concerns[7]. Cloud users access the cloud through a Cloud Portal, which enables them to choose a service from a catalog, with the cloud management system allocating the appropriate resources via the provisioning service. The optional cloud monitoring and metering system keeps track of cloud use and lets you allocate resources to specific users. The fact that computers are not directly accessible via network connections, but rather by the services they offer, gives the cloud a high level of openness. Users may actually access certain cloud components (application brokers) that distribute requests to specific servers.

As illustrated in Fig. 4, cloud security components are defined, and an architectural solution for cloud computing environments is suggested. Security components and services must be visible and generic in order to maintain the openness of cloud computing.

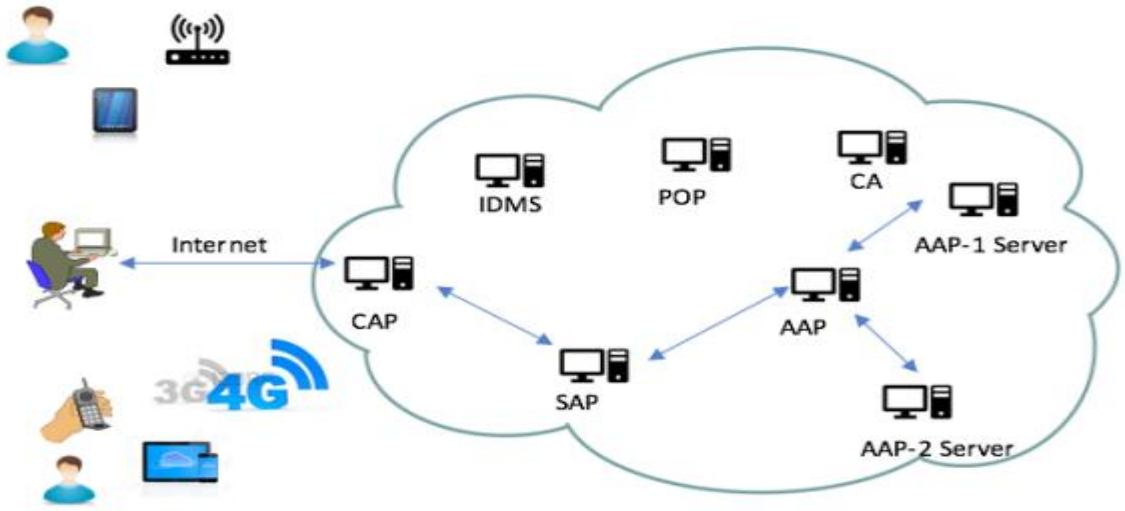

Figure 4: Security Components and Architecture for Cloud Computing [8]**.**

25.3.2. Steganography for Secrecy of Data Stored in the Cloud:

In general, when it comes to cloud computing, there are two main security concerns:

- People are skeptical that service providers would not exploit client data housed on an unknown server.
- When data is put into the server, it is exposed.

Since a result, managing "data-at-rest" in cloud computing is critical, as it must be secured from unwanted users. Today's encryption techniques are employed by storage devices to prevent unwanted access to data; nevertheless, if malevolent users get access to encryption and decryption keys, encryption methods will not offer permitted access.

25.3.3. The 5 Layer Cloud Security Architecture:

Bhadoria et al. developed a four-layer cloud security architecture that protects all three key components of cloud computing: identity, information, and infrastructure [9]. This architecture is finished with a 5th extra layer, as shown in Figure 5 that enhances cloud computing data trust and therefore security for data at rest in the cloud by concealing information in pictures [10].

- Layer 1 is based on a third-party cloud provider's Cloud Identity Access Management (IAM) function gateway. It explains how to use the IAM function. This will be accomplished by integrating provisioning/de-provisioning, authentication, federation, and authorization into web security application services. These online security apps will be utilized as an additional layer of security.
- A firewall is introduced at Layer 2 to improve network security control (allow ports and IP access). This layer protects both the physical infrastructure of the service client and the physical infrastructure of the cloud service.
- Layer 3 improves client data isolation by separating organizations' data and utilizing private VLANs that are set based on access limitations for each customer's virtual machine, based on Access Control Lists.
- For each client, Layer 4 employs virtual demilitarized zone security (DMZ). This virtual zone will limit access to information stored on the private VLAN. CSP will also have a DMZ zone that all customers will be able to access. Data about all consumers will be kept in this zone — without impacting the data of individual customers.

- Security Layer 5 is an additional layer that considers the steganography method. It uses pictures to conceal data stored in the public cloud.

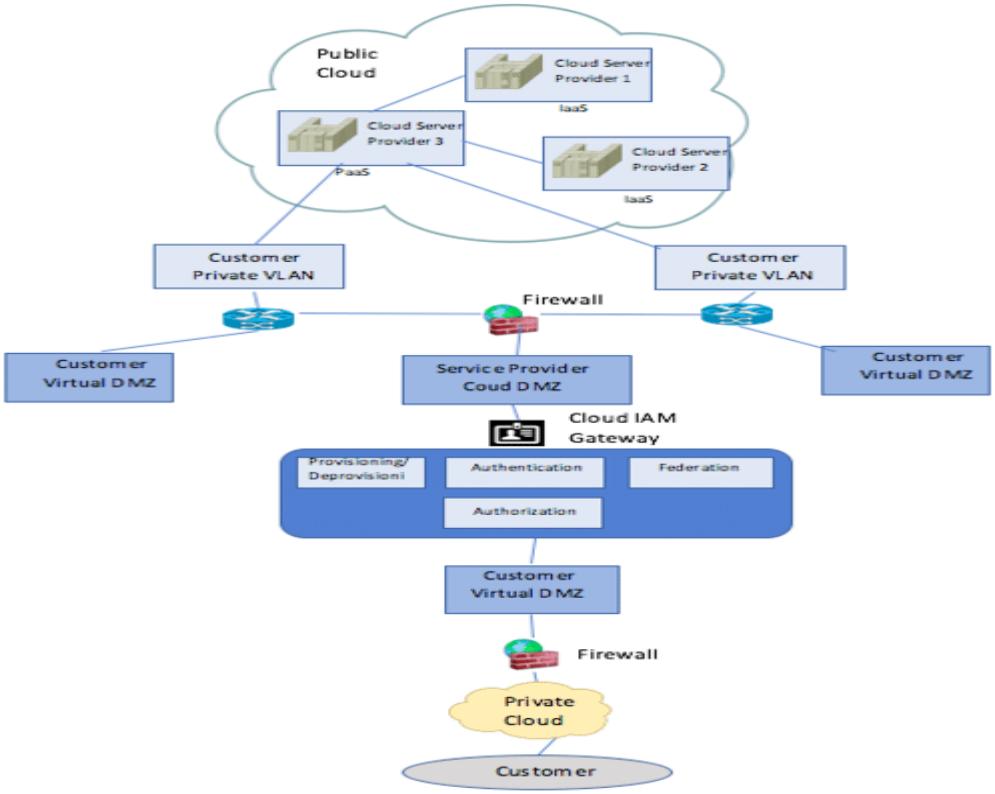

Fig. 5: The 5 Layer CSA Architecture [10]

26. CONCLUSION

Data confidentiality and data protection are significant research directions today, therefore we concentrated our efforts on finding the finest solutions that satisfy the development requirements of smart campus development while also ensuring smart campus data security, with a special emphasis on data secrecy. We suggested a smart campus design that combines the usage of cloud computing and IoT, starting with the establishment of the smart campus model. The paper's main contribution is a secure and confident 5-layer cloud architecture solution that can be used for our proposed Smart Campus System Architecture in order to ensure a high level of security and data confidentiality for the smart campus - the essential backbone for a true smart campus development. The prototype solution is meant to be used in the instance of the University of Oradea's Smart Campus, which has a lot of room for growth.

Our suggested solution is still under development, but it contains basic capabilities as well as support for more sophisticated analyses. The development of new suitable software tools to enhance safe cloud architecture solutions and assist smart campus development will be the focus of future efforts.

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A SURVEY OF FOG COMPUTING: PRIVACY AND SECURITY CONSIDERATIONS

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ABSTRACT

Because of the inherent limitations of Internet of Things (IoT) devices, such as limited storage and computing capacity, a new platform is required to handle data effectively. Fog computing is a technique that was developed to bridge the gap between distant data centers and IoT devices. Fog computing offers a number of advantages, including increased security, reduced bandwidth, and lower latency. Because of these advantages, fog is an ideal paradigm for many IoT services in a variety of applications, including linked cars and smart grids. Nonetheless, fog devices, like conventional data centers, are exposed to a variety of security and privacy risks. The authors of this paper address security and privacy concerns in IoT settings and suggest a fog-based method to optimize the dissemination of certificate revocation information across IoT devices for increased security. They also discuss possible research paths for utilizing fog computing to improve security and privacy in IoT settings.

KEYWORDS:*Edge Computing, Fog Computing, Internet Of Things (Iot), Privacy, Security.*

27. INTRODUCTION

The rise of ubiquitously linked smart gadgets is changing the computer landscape. Wearable computing, smart metering, smart home/city, linked cars, and large-scale wireless sensor networks are all contributing to the Internet of Things, which connects and smartens everything (IoT). According to IDC (International Data Corporation), "the Internet of Things will continue to quickly grow the conventional IT industry" in 2015, increasing 14% from 2014 [1]. As we all know, smart gadgets confront a slew of issues relating to computing power, battery life, storage, and bandwidth, all of which impede Quality of Service (QoS) and user experience. Cloud computing is a potential computing paradigm that may provide services to end users in terms of infrastructure, platform, and software, as well as provide applications with elastic resources at cheap cost, to relieve the strain of restricted resources on smart devices.

However, cloud computing is not a "one-size-fits-all" answer. Since IoT applications often need mobility support, geo distribution, position awareness, and low latency, there are still issues to be addressed. Fog computing, also known as edge computing, aims to enable computation at the network's edge, allowing billions of linked devices to benefit from new applications and services

[2]. Set-top boxes, access points, roadside units, cellular base stations, and other fog devices are common. End devices, fog, and cloud create a three-layer hierarchical service delivery architecture that supports online content distribution, augmented reality, and big data analysis. Figure 1 depicts a typical fog/cloud infrastructure conceptual design.

Because fog is considered a non-trivial extension of cloud computing, certain security and privacy problems that arise in cloud computing are expected to have an unavoidable effect on fog computing. If security and privacy concerns are not addressed, fog computing adoption will lag, owing to the fact that 74 percent of IT executives and chief information officers reject cloud computing due to security and privacy concerns. Because fog computing is still in its infancy, little attention has been paid to security and privacy concerns. Because fog computing is suggested in the context of the Internet of Things (IoT) and evolved from cloud computing, fog computing inherits cloud security and privacy concerns. While certain problems may be handled using current methods, others face new hurdles as a result of fog computing's unique features, such as heterogeneity in fog nodes and fog networks, the need for mobility support, large scale geo-distributed nodes, location-awareness, and low latency.

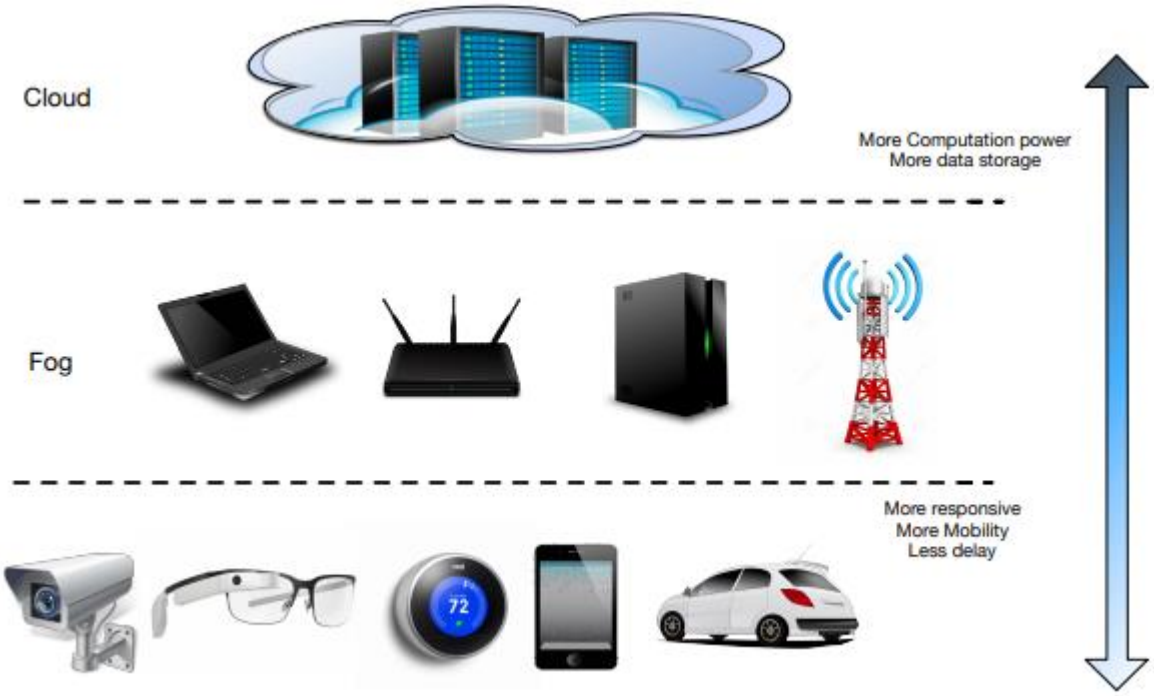

Figure 1: An example of fog/cloud architecture [3]

We will address various security and privacy concerns in fog computing in this article by analyzing current fog computing work as well as related work in underlying areas to identify security and privacy issues.

27.1. Fog Computing Overview:

This section provides a high-level overview of fog computing. We prefer not to address cloud computing or mobile cloud computing, and anyone interested in learning more may consult previous surveys.

27.1.1. Definition:

Fog computing, as a new computer paradigm, is still a nascent idea in the community. Fog computing is defined in this article as an extension of cloud computing to the network's edge, and it is a highly virtualized resource pool that offers compute, storage, and networking services

to local end users. Fog computing is a scenario in which a large number of heterogeneous (wireless and sometimes self-reliant) pervasive and decentralized devices communicate and potentially collaborate among themselves and with the network to perform storage and processing tasks without the involvement of third parties [4]. These responsibilities may include supporting fundamental network operations as well as developing new services and apps for use in a sandboxed environment. Users that lease a portion of their devices to host these services are rewarded. Fog computing is no longer a buzzword, despite the fact that its meanings are still disputed.

27.1.2. Characterization:

Fog computing benefits from its edge position since it can serve applications with low latency needs (e.g. gaming, augmented reality, real-time video stream processing). This edge location may also give extensive network context information, such as local network state, traffic statistics, and client status, which fog applications can utilize to enable context-aware optimization. Another intriguing feature is position awareness; the geo-distributed fog node can not only infer its own location, but it can also monitor end user devices to enable mobility, which may be a game changer for location-based services and applications. Interactions between fog and fog, fog and cloud, and fog and cloud are also essential since fog may readily get local overview but worldwide coverage can only be obtained at a higher layer.

28. DISCUSSION

28.1. Security and Privacy Issues:

We acknowledge that while building a fog computing system, security and privacy should be considered at every layer. “What is new about fog computing security and privacy?” we ask ourselves. Because of the features of fog computing, we may need to do further work in the future to solve those issues.

28.1.1. Trust and Authentication:

Data centers are often owned by cloud service providers in cloud computing deployments. However, owing to various deployment options, fog service providers may be distinct parties: 1) Internet service providers or wireless carriers with control of home gateways or cellular base stations may create fog using their current infrastructures; 2) Cloud service providers that wish to extend their cloud services to the network's edge can build fog infrastructures as well. 3) End users that possess a local private cloud and want to lower their ownership costs would want to convert it to fog and lease excess resources on the local private cloud. Fog's trust condition is complicated by this flexibility.

- **Trust Model:**

In eCommerce, peer-to-peer (P2P), user reviews, and online social networks, the reputation-based trust model has shown to be effective. Damiani et al. developed a robust reputation system for resource selection in P2P networks, which uses a distributed polling method to evaluate a resource's trustworthiness before downloading it [5]. We may need to address problems such as 1) how to establish permanent, unique, and distinct identity, 2) how to handle deliberate and unintentional misbehavior, and 3) how to perform reputation punishment and redemption while building a fog computing reputation-based reputation system. There are other trusting models based on specific hardware that may offer trust utility in fog computing applications, such as Secure Element (SE), Trusted Execution Environment (TEE), or Trusted Platform Module (TPM).

- **Rogue Fog Node:**

A rogue fog node is a fog device or fog instance that masquerades as genuine in order to get end users to connect to it [6]. A fog administrator, for example, may be allowed to manage fog instances but may instead create a rogue fog instance in the event of an insider assault. The possibility of a man-in-the-middle attack in fog computing has been proven, and the gateway should either be hacked or replaced with a fake one before the assault. Once linked, the attacker may simply modify incoming and outgoing requests from end users or the cloud, surreptitiously gather or tamper with user data, and launch further assaults. The presence of a false fog node poses a significant risk to user data security and privacy. This is a difficult issue to solve in fog computing for a variety of reasons. 1) Different trust management methods are required in complicated trust situations; 2) maintaining a blacklist of rogue nodes is difficult due to the dynamic creation and deletion of virtual machine instances. Han et al. presented a measurement-based technique for preventing a client from connecting to a rogue access point (AP). To identify rogue APs at the client side, they utilize the round-trip duration between end users and the DNS server.

- **Authentication:**

Because front fog nodes provide services to massive-scale end users, authentication is a critical problem for fog computing security. The primary security problem of fog computing, according to Stojmenovic et al., is authentication at various levels of fog nodes [7]. Traditional PKI-based authentication is inefficient and inefficiently scalable. Balfanz et al. presented a low-cost, secure, and user-friendly solution to the authentication issue in local ad-hoc wireless networks, which relies on a physical touch for pre-authentication in a location-limited channel [8]. In the case of cloudlets, NFC may also be utilized to ease the authentication process. With the rise of biometric security in mobile computing and cloud computing, such as biometric verification, face authorization, touch-based or keystroke-based authorization, and so on, biometric based authentication in fog computing will be advantageous.

28.1.2. Network Security:

Because wireless is so prevalent in fog networking, wireless network security is a major issue. Jamming attacks, sniffer attacks, and other types of assaults are examples. These threats can be handled in the wireless network research area, which is beyond the scope of this study [9]. Normally, we must trust the settings created manually by a network administrator and separate network administration traffic from normal data traffic in a network. Fog nodes, on the other hand, are placed at the Internet's edge, putting a significant strain on network administration. Consider the expense of running large scale cloud servers that are dispersed throughout the network edge with no simple access for maintenance. In many areas of fog computing, SDN may simplify installation and administration while also increasing network scalability and lowering costs. We also suggest that using SDN in fog computing will provide new problems and possibilities for fog networking security.

28.1.3. Secure Data Storage:

User data is outsourced to fog nodes, and users' control over data is given over to fog nodes, posing the same security risks as cloud computing. First, data integrity is difficult to guarantee since outsourced data may be lost or improperly changed. Second, the submitted data may be utilized for other purposes by unauthorized parties.

To safeguard data from these risks, an auditable data storage service has been suggested in the context of cloud computing. To guarantee integrity, secrecy, and verifiability for cloud storage systems, techniques such as homomorphic encryption and searchable encryption are used to enable a client to verify its data stored on untrusted servers. Want et al. suggested privacy-preserving public auditing for cloud data that depends on a third-party auditor (TPA), utilizing a

homomorphic authenticator and a random mask method to preserve privacy from TPA. Prior storage systems dealt with data corruption detection and repair using erasure codes or network coding, while Cao et al. developed a method utilizing LT code, which offers reduced storage cost, considerably quicker data retrieval, and similar communication cost. Yang et al. have given a fair summary of current work in cloud computing data storage auditing services.

28.1.4. Secure and Private Data Computation:

Another major problem in fog computing is how to outsource computation to fog nodes while keeping it safe and private.

- **Verifiable Computing:**

Verifiable computing allows a computer equipment to outsource the calculation of a function to other, potentially untrustworthy servers while still ensuring that the results are verifiable. The other servers evaluate the function and provide the result, along with a verification that the function was computed properly. The fog user should be able to verify the accuracy of the computation offloaded to the fog node to instill confidence in the computation offloaded to the fog node.

- **Data Search:**

To preserve data privacy, end users' sensitive data must be encrypted before being sent to the fog node, making effective data utilization services difficult. Keyword search, i.e. keyword search among encrypted data files, is one of the most essential services. Researchers have devised a number of searchable encryption methods that enable a user to do secure keyword searches over encrypted material without having to decode it. The authors presented the first ever search method for encrypted data, which includes proven secrecy for encryption, query isolation, controlled searching, and concealed query support.

28.1.5. Privacy:

When end users utilize services like cloud computing, wireless networks, and IoT, the leakage of private information such as data, location, and use is getting attention. Because fog nodes are closer to end users and may gather more sensitive data than the distant cloud on the core network, maintaining such privacy in fog computing poses additional difficulties. In a variety of situations, such as the cloud, smart grid, wireless network, and online social network, privacy-preserving methods have been suggested.

- **Data Privacy:**

Privacy-preserving algorithms can operate in the fog network between the fog and the cloud, but they are typically resource prohibitive at the end devices. Sensors and end devices produce sensitive data, which is collected by fog nodes at the edge. At the local gateways, techniques like homomorphic encryption may be used to provide privacy-preserving aggregation without decryption. In the case of statistical inquiries, differential privacy may be used to guarantee that the privacy of an arbitrary single item in the data set is not revealed.

- **Usage Privacy:**

Another privacy concern is the manner in which a fog client use fog services. For example, with a smart grid, the reading of a smart meter would reveal a lot of information about a household, such as when no one is at home and when the TV is switched on, which is completely in violation of the user's privacy. Despite the fact that privacy-preserving methods have been suggested for smart metering, they cannot be directly used to fog computing owing to the absence of a trusted third party (i.e., a smart meter in a smart grid) or a counterpart device such as a battery. The fog node, which may readily gather end-user use data. One naïve approach is

for the fog client to generate fake jobs and offload them to several fog nodes, thus concealing its actual activities behind the dummy ones. This approach, on the other hand, will raise the fog client's payment as well as waste resources and energy. Another option is to devise a clever method of dividing the program to ensure that offloaded resource usages do not reveal personal information.

- **Location Privacy:**

The term "location privacy" in fog computing refers to the secrecy of fog clients' locations. Because a fog client often offloads its duties to the closest fog node, the fog node to which the tasks are offloaded may deduce that the fog client is close by and further away from other nodes. In addition, if a fog client uses several fog services at different places, it may reveal its route trajectory to the fog nodes if the fog nodes cooperate. As long as a fog client is connected to a person or an essential item, the person's or object's location privacy is jeopardized.

If a fog client always picks the closest fog server, the fog node may be certain that the fog client using its computational resources is close by. The only option to keep location privacy is to use identity obfuscation, which means that even if a fog client is close, the fog node cannot identify the fog client. Identity obfuscation may be accomplished in a variety of ways; for example, the authors employ a trusted third party to create false ID for each end user. In reality, a fog client does not always select the closest fog node, but instead chooses one of the fog nodes it can reach based on latency, reputation, load balance, and other factors. In this scenario, the fog node can only estimate the fog client's position but not pinpoint it. When a fog client uses computational resources from several fog nodes in an area, however, its location may be reduced to a tiny zone since it must be near the intersection of the numerous fog node coverages.

28.1.6. Access Control:

Access control has shown to be a dependable technique for ensuring system security while also protecting user privacy. Access control in the traditional sense is typically handled in the same trust domain. Because of the outsourced nature of cloud computing, access control is often handled cryptographically for outsourced data. In terms of key management, a symmetric key-based approach is not scalable. To accomplish fine-grained access control, many public key based methods have been suggested. Yu et al. presented an attribute-based encryption-based fine-grained data access control system (ABE). In fog computing, it will be difficult to build access control that spans client-fog-cloud while still meeting design objectives and resource limitations.

28.1.7. Intrusion Detection:

Intrusion detection techniques are widely used in cloud systems to mitigate attacks such as insider attacks, flooding attacks, port scanning, and attacks on virtual machines and hypervisors, as well as in smart grid systems to monitor power meter measurements and detect abnormal measurements that may have been compromised by attackers [10]. By monitoring and analyzing log files, access control rules, and user login information, IDS may be implemented on the fog node system side to identify intrusive activity in fog computing. They may also be used on the fog network to identify malicious assaults like denial-of-service (DoS), port scanning, and other types of attacks. It opens up new avenues for research into how fog computing may assist with intrusion detection on both the client and centralized cloud sides. A cloudlet mesh-based security architecture has been described by an author that can detect intrusion to a distant cloud while also protecting communication between mobile devices, cloudlets, and the cloud. Implementing

intrusion detection in geo-distributed, large-scale, high-mobility fog computing environments to satisfy the low-latency requirement is also a problem.

29. CONCLUSION

The Internet of Things (IoT) is a rapidly expanding field of study. However, owing to the heterogeneous nature of the linked devices, it still faces many difficulties in terms of implementing access control systems. Because access control is so important, the bare minimum of privileges must be given to ensure that the maintainer cannot utilize all permitted rights during maintenance, as is the case with RBAC and ABAC. Traditional access control schemes need extensive modification and adaption. For this, a publicly accessible capability-based access system for access capabilities and revocation services is being used. Because of the pervasive nature of IoT networks and devices, centralized design has been used to safeguard smart services and resources in recent years. Authentication and authorization duties are handled by back-end servers in this scenario. Traditional access control mechanisms do not provide end-to-end security. As a result, central architecture in the IoT cannot offer scalability for smart items.

This article looks at various security and privacy concerns in the context of fog computing, which is a novel computing paradigm for providing elastic resources to nearby end users at the network's edge. We discuss security issues like secure data storage, secure computation, and network security in this paper. We also discuss data privacy, use privacy, and location privacy, all of which may need fresh thinking in order to adapt to new problems and changes.

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A COMPREHENSIVE STUDY OF CLOUD COMPUTING SECURITY

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ABSTRACT

According to a study, Information Technology (IT) security spending had risen to 79.1 percent in 2015, representing an annual growth of more than 10%. According to the International Data Corporation (IDC), 74.6 percent of corporate clients rated security as a significant issue in 2011. This document compiles a number of peer-reviewed papers on cloud computing security risks and countermeasures. Our study aims to better understand cloud components, security problems, and dangers, as well as developing solutions that may help reduce cloud vulnerabilities. It is a well-known truth that the cloud has been a viable hosting platform since 2008; nevertheless, the view of cloud security is that it requires substantial changes in order to achieve greater rates of adaptation at the corporate scale. Many of the problems facing cloud computing, as highlighted by another study, need to be addressed immediately. The industry has made considerable progress in combating cloud computing risks, but there is still work to be done to reach the level of maturity that conventional or on-premise hosting has.

KEYWORDS: *Cloud Security, Cloud Computing, Security Threats, Security In Cloud.*

30. INTRODUCTION

Cloud computing is being used by a growing number of users, ranging from businesses to individuals. According to a Right Scale study, the typical user uses at least four cloud-based apps and is considering another four at any one moment[1]. According to the study, 41% of business organizations use public clouds to handle substantial workload. With so much of our burden going to the cloud, cloud computing security is becoming more of a concern. This estimate is backed up by a Forbes study from 2017, which claims that although 80 percent of all IT expenditures would be dedicated to cloud solutions in the next 15 months, 49 percent of companies are postponing cloud implementation owing to security skills gaps and concerns[2]. Lack of competent resources, lack of maturity, competing best practices, and complicated business frameworks, to mention a few, seem to be part of the issue. Cloud adoption has reached a tipping point, and it is anticipated that more workloads will migrate from conventional local storage to cloud, not only from ordinary Internet users, but from most, if not all, business organizations. While there are many issues that must be identified, analyzed, and addressed, this

article tries to review cloud computing security and reports on different elements of security vulnerabilities and remedies. The following are some questions that need immediate answers[3]:

- Data Location
- Data Protection and Recovery Support
- Data Segregation
- Investigative Support
- Long-term Viability
- Privileged User Access Management
- Regulatory Compliance

These concerns, as well as other potential hazards, should be evaluated and addressed. The following are some examples of possible assessments[4], [5]:

- Application migration and performance risk
- Extended supply chain risks
- Organization capability and maturity
- People risks
- Policy risks
- Process risks
- Technology & data risks

This paper brings together a number of studies that look at the dangers, vulnerabilities, and possible controls associated with cloud computing. It also includes details on the most popular cloud architectures and frameworks. Furthermore, the paper suggests possible future research topics in cloud computing security. The following is how the rest of the paper is organized: Section 2 delves into the cloud architecture, as well as the security implications of various deployment and delivery methods, as well as general vulnerabilities, attacks, and threats. It also contains information on countermeasures and controls. Finally, part 3 brings the study to a close by outlining possible future paths.

31. DISCUSSION

31.1. Cloud Architecture:

It's crucial to grasp the cloud concept and architecture before diving into security concerns. Cloud computing, according to Sharma and Trivedi, is a collection of resources that can be scaled up and down on demand. It's a self-service approach that requires little to no contact with the service provider via the Internet. With creative, technological, and pricing possibilities, cloud allows new methods of providing goods and services.

There are five main variables that affect and are influenced by cloud computing, as shown in Table 1 from NIST's Cloud Computing Reference Architecture, as well as its security implications. The danger and risk perceptions of cloud consumers and providers are the subject of this study.

TABLE 1: FACTORS IN NIST CLOUD COMPUTING REFERENCE ARCHITECTURE[6], [7]

Actor	Definition
Cloud Consumer	A person or Organisation that maintains a business relationship with, and uses service from, *Cloud Provider*
Cloud Provider	A person, organisation, or entity responsible for making a service available to interested parties
Cloud Auditor	A party that can conduct independent assessment of cloud services, information system operations, performance, and security of the cloud implementation
Cloud Broker	An Entity that manages the use, performance, and delivery of cloud services and negotiates relationship between *Cloud providers* and *Cloud Consumers*
Cloud Carrier	An intermediary that provides connectivity and transport of cloud services from *Cloud Providers* to *Cloud Consumers*

Figure 1 depicts a full cloud computing reference architecture. It's worth noting that the diagram depicts an end-to-end reference design that covers all seven levels of the Open Systems Interconnection (OSI) model, as well as business, commercial, and governance considerations. Cloud computing, as is clear, is a complete and sophisticated solution with many weaknesses.

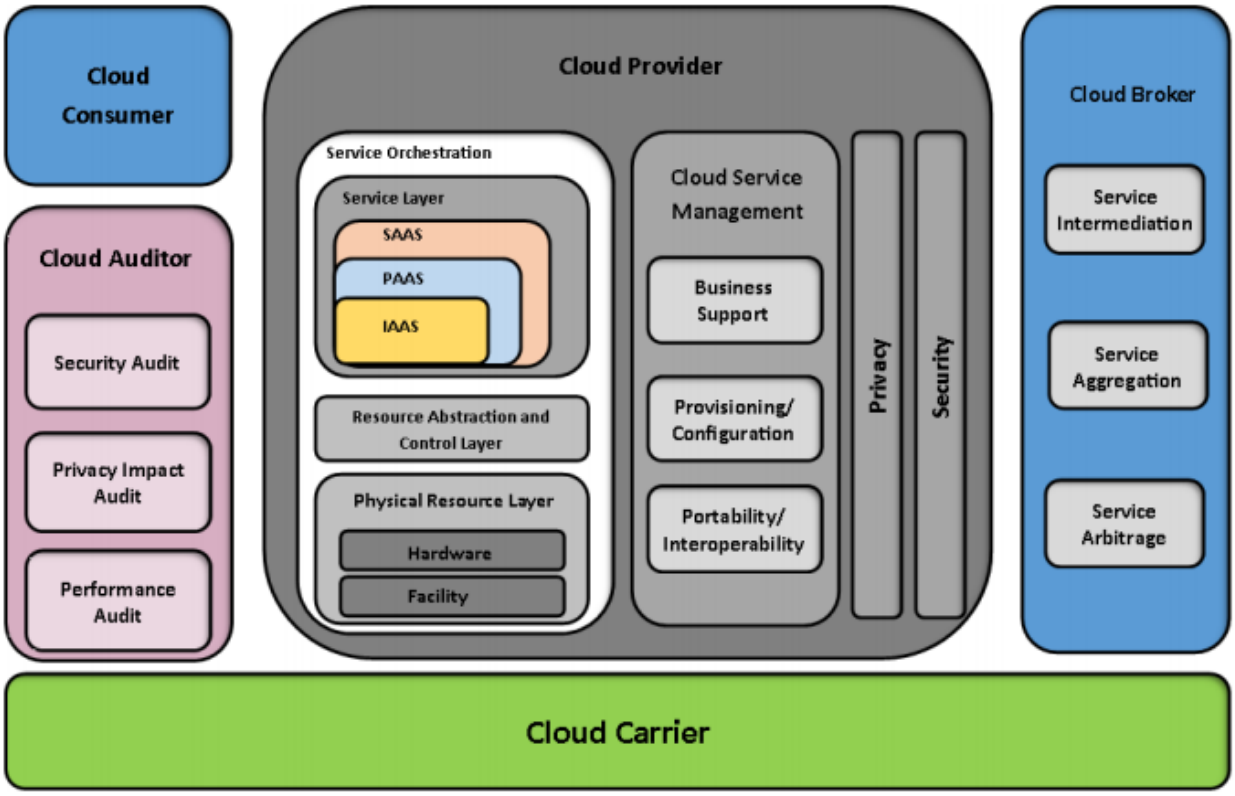

Figure 1: NIST Cloud Computing Reference Architecture[8]

31.1.1. Advantages of Cloud:

There are some unique advantages to cloud computing and some of them are listed below[9].

a. Almost immediate access to the resources.

b. Cost of entry for all organizations including small firms.

c. Implement and/or offer new class of application and delivery services.

d. Reduction in IT barriers to innovation.

e. Easy to scale the services.

31.2. Security Implications based on Deployment and Delivery Model:

The two most important aspects that determine the level of vulnerability in a cloud-computing platform is the choice of deployment and delivery model. According to NIST, there are three

deployment and three delivery models that are considered as industry standards. Each of these three deployment and delivery models have unique security implications. The following sub-sections briefly discuss each of these models and their security implications:

31.2.1. Cloud Deployment Model:

The three most common types of cloud deployment models are Private Cloud, Public Cloud, and Hybrid Cloud as illustrated in Table 2[10].

TABLE 2: ILLUSTRATES THE CLOUD DEPLOYMENT MODEL[10]**.**

Deployment Type	Description	Implications	Challenges
Private Cloud	The cloud service provider pools scalable resources and virtual applications and makes them accessible to cloud customers in a private cloud. The resources are allocated to a single or a group of companies under this deployment paradigm, and the intranet capability is regarded as such. The invoicing is typically done on a subscription basis, with the cloud user committing to a minimum amount of time.	Positive security implications are quite substantial, and the organization has considerable control over the deployment architecture, procedures, and tools.	High installation and administration costs, expertise requirements, and vulnerability management are among security difficulties. Cost and return on investment are important considerations in this deployment strategy, and security implementation is typically dependent on risk assessment, thus security coverage is not complete.

Public Cloud	Resources are dynamically committed on a fine-grained, self-service basis in a public cloud through the Internet or a portal10. The majority of billing is dependent on use and is paid on a pay-per-use basis.	Because of the high number of cloud users and transaction volumes involved, there are positive security implications. Because of its install once and use many times approach, which substantially lowers the cost of security implementation for the customer, the cloud service provider often has a sophisticated and layered security system that may possibly offer a high level of protection.	Because the resources are not dedicated but shared among many cloud users, security risks are increased. This not only adds to the effort of ensuring that all apps and data accessible on the public cloud are secure, but it also requires managing a plethora of external factors such as legal, data protection, and so on.
Hybrid Cloud	A hybrid cloud is a deployment strategy in which a private cloud is connected to one or more external cloud services and controlled from a central location. It offers cloud users with a versatile and fit-for-purpose solution that is relatively simple to use. In terms of billing and advertisements, hybrid clouds have a greater level of complexity.	Positive security implications include the ability to custom-build protection for identified weaknesses, threats, and dangers. As a result, it is both cost-effective and targeted.	Because the deployment strategy is complicated, with a heterogeneous environment, various orchestration, and automation technologies, security concerns are quite significant. This will add to the administrative burden, and any oversight will expose the company to considerable risk.

31.2.2. Cloud Delivery Model:

Platform as a Service (PaaS), Infrastructure as a Service (IaaS), and Software as a Service (SaaS) are the three cloud delivery models suggested by NIST and used by the industry

TABLE 3: CLOUD DELIVERY MODEL[11]

Delivery Type	Description	Risk and responsibility
Infrastructure as a Service (IaaS)	Infrastructure as a Service (IaaS) is a multi-tenant cloud layer in which the cloud service provider only shares dedicated resources with contractual customers for a pay-per-use charge.	This is a fantastic approach in which the cloud user creates the application without having to worry about the infrastructure. The cloud service provider and the cloud customer share security responsibilities equally. The risk is segmented and stacked in this approach. It's also a risk-sharing model.
Platform as a Service (PaaS)	Platform as a Service (PaaS) is a common delivery model in which the cloud provider provides both the operating system and the development stack. Database and application management, as well as development services, are typical practices for providers under this paradigm. PaaS, like IaaS, is a pay-per-use model.	This is a suitable paradigm, in which the cloud consumer delivers application knowledge, as well as licenses, data, and resources, to the platform shell and consumes it. Consumers that lack infrastructure expertise or wish to save money on the significant capital expenditure (capex) needed to construct infrastructure adopt this approach. The security duty shifts more on the cloud provider in this delivery paradigm. This is a shared risk paradigm, similar to IaaS, except the service provider carries a greater risk than the customer since the provider supports more levels.
Software as a Service (SaaS)	In a Software as a Service approach, the cloud provider hosts the whole application stack and offers end-to-end resources, such as licensing, application, and networking. In a web service or software-oriented architecture, the cloud consumer usually provides data and business processes to consume the services.	This approach is particularly useful when the cloud user lacks the required expertise, time, or resources to build up and maintain an application ecosystem. This approach also offers the greatest commercial advantage while requiring no upfront capital expenditure. The cloud provider is primarily responsible for security. Client-side vulnerabilities are mostly the responsibility of the customer. The service provider is the one who carries the greatest risk in this arrangement.

31.3. General Vulnerabilities, Threats, and Attacks in Cloud:

Cloud computing, like other areas of IT, has a variety of security concerns that must be addressed. These dangers include policy and organizational dangers, technological dangers, and legal and other dangers.

31.3.1. Vulnerabilities and open issues:

Cloud is a collection of technology, processes, people, and business models. Cloud, like any other technology, process, person, or business creation, has flaws. The following are some of the cloud's vulnerabilities. The following are some of the outstanding problems and dangers that need immediate attention:

- **Data Breach:**

The danger of an accidental, malicious, or deliberate data breach is significant when data security moves from the cloud customer to the cloud service provider.

- **Shared Technology vulnerabilities:**

Increased resource leverage provides attackers with a single point of attack, which may inflict harm that is out of proportion to its significance. A hypervisor or cloud orchestration are examples of sharing technology.

- **Account of Service traffic hijacking:**

Access to the cloud through the Internet is one of its greatest benefits, but it also comes with the danger of account breach. Losing access to a privileged account may result in service interruption.

- **Malicious Insider***:*

In a cloud site, a motivated insider may discover additional methods to attack and hide the trail.

- **Denial of Service (DoS):**

Any denial of service assault on the cloud provider has the potential to disrupt all of the tenets.

- **Internet Protocol:**

IP spoofing, ARP spoofing, and DNS poisoning are just a few of the IP vulnerabilities that may be exploited.

- **API & Browser Vulnerabilities:**

When combined with social engineering or browser-based assaults, any vulnerability in a cloud provider's API or interface presents a major danger; the damage may be considerable.

- **Injection Vulnerabilities:**

Vulnerabilities in the administration layer, such as SQL injection flaws, OS injection, and LDAP injection, may create significant problems for many cloud users.

- **Changes to Business Model:**

A cloud consumer's business model may be significantly altered by cloud computing. The IT department, as well as the company, must adapt or risk being exposed to danger.

- **Malicious Insider:**

A hostile insider is always a threat, but a malicious insider at a cloud provider may do substantial harm to a large number of customers.

- **Abusive Use:**

Certain cloud computing capabilities, such as the usage of a trial period of use to conduct zombie or DDoS assaults, may be used for malicious offensive objectives.

- **Availability:**

The likelihood that a system will perform as expected and on time.

31.3.2. Attack Vectors:

Network, hypervisor, and hardware are the three main attack vectors, according to a recent study. External, internal, and cloud provider or insider assaults are linked to these vectors, accordingly.

32. CONCLUSION

Cloud computing security is developing in lockstep with dangers, which are frequently identified too late to avoid disasters. Cloud computing poses a unique and serious danger to all players owing to its disruptive nature, complicated design, and leveraged resources. Understanding the risk and properly mitigating it is important for all stakeholders and actors. To properly minimize the risk, security must be integrated into every tier of a cloud-computing platform by integrating best practices and new technology. Consumers, providers, brokers, carriers, auditors, and everyone else in the cloud must take the required measures against hazards in order to properly protect the cloud computing platform, or face substantial and sometimes business-critical risk. Security engineering offers best practices, methodologies, and techniques for creating systems and services that are designed for security, sustainability, and resilience, according to a recent study. It's critical to continue this study so that best practices may be applied to additional applications and use cases. Further study in the systems development life cycle (SDLC) for cloud customers is also required in order to integrate different development and technological advancement models, as well as container systems like Docker, to enhance security at a basic level. Furthermore, there is relatively little study on the effect of training and personnel on security. Understanding the difficulties, needs, and effects of good security training for customers and other providers may be done.

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REPLICATION OF HBV DNA IN HEPATOCYTES IN THE ABSENCE OF HBV DNA IN BLOOD PLASMA IN PATIENTS WITH HDV INFECTION

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ABSTRACT

The results of the vast majority of studies of HDV infection indicate a high incidence of LC as an outcome of the disease with rapid development of liver decompensation. Against the background of rapid progress in the treatment of hepatitis C, the role of the insufficiently studied and difficult to treat HDV infection is currently increasing. The use of interferon preparations does not guarantee a cure in the majority of patients with delta infection, does not provide stable elimination of the virus, and gives many side effects.The presented methodological recommendations developed on the basis of the results of studies carried out in the clinical base of the RSSPMCEMIPD, showed that the administration of nucleoside analogs to patients with HDV infection significantly reduced the concentration of HBV DNA in the liver biopsy, which indicates a decrease in the risk of cytolysis in liver cells.

KEYWORDS: *HDV Infection, HBV DNA, Replication, Liver Biopsy, PCR, Nucleoside Analogs.*

INTRODUCTION

Until today, many aspects of the pathogenesis of hepatitis delta remain unclear. The reasons for such an aggressive persistence of the virus and the role of the HDV virus in suppressing HBV virus replication in the liver cell are not fully understood. Thus, the study of molecular interactions between HDV and HBV viruses remains relevant.

Coinfection and superinfection lead to suppression of HBV replication in both patients and animals and cell models. The observation that HDV can suppress HBV in a coinfected or superinfected setting has also been reported in several retrospective studies (1,2,6,7,9,10).

In a clinical study, Jardi et al. analyzed HBV / HDV coinfection, mixed HBV / HCV / HDV infection, as well as patients with HBV and HCV monoinfection. The authors found that HDV

appears to suppress both HBV and HCV viremia, although HCV replication is reduced to a greater extent than HBV (5).Similar data are given by Heidrich et al. The results of the authors' studies showed that HDV infection suppressed the replication of both HBV and HCV. At the same time, the levels of HBV DNA and HCV RNA did not affect HDV replication in the patient group, the mean HBsAg levels did not differ significantly in patients with HBV monoinfection and with HBV / HDV coinfection (4). Eyster et al. and Mathurin et al. also supported these observations, found that HDV dominates HCV in patients with triple infection, since HCV serum RNA and HBV replication markers were not detected in most patients (3).

To investigate the interaction of HBV and HDV during coinfection, Schaper et al. published interesting data. In 25 patients with chronic HBV / HDV infection, the replicative activities of HBV and HDV were assessed over 8 years. Seven different replication profiles were observed in these patients. In 20% of co-infected patients, they showed persistent HDV activity in the absence of HBV activity; 12% showed persistent activity of both viruses, 12% showed persistent HBV activity in the absence of HDV replication. Of the remaining 56% of patients, 24% showed fluctuating activity for both viruses, and 32% for one of the two viruses. But in most of the observed patients (60%), HDV was dominant (8).

The clinical guidelines of the European Association for the Study of Liver Diseases indicate that the use of nucleoside analogs (AN) does not interfere with HDV replication and associated disease. AH therapy is recommended for patients with HB DNA levels above 2000 IU / ml, patients with decompensated liver disease with detectable HBV DNA levels in HDV infection.

Considering the availability of numerous data and the variety of research results, we determined the goal: to determine the presence of HBV DNA in liver biopsies in patients with CVHB and D with negative PCR for HBV DNA in blood plasma, as well as to assess the feasibility of antiviral AN therapy in this category of patients.

The study was carried out in 32 patients who applied for hospitalization at the NIIEMIZ clinic with a diagnosis of "Chronic viral hepatitis B with a Delta agent". The criterion for the selection of patients with CVHD was the absence of HBV DNA in the blood plasma. The quantitative levels of HDV RNA in the blood were high and the average level was 7658710 copies / ml. To determine the presence and amount of HBV DNA in hepatocytes, all patients underwent liver biopsy. The amount of HBV DNA in the biopsy was determined by PCR. It should be noted that out of 32 examined patients 18 (56.2%) took AN therapy: tenofovir disoproxil fumarate 300 mg / day, 14 (43.8%) did not take nucleoside analogs.

The patients were between 19 and 50 years old and their average age was 35.1 years. There were 23 (71.9%) men and 9 (28.1%) women. Of 32 patients, 13 (40.6%) had Class A LC and 19 (59.4%) had a chronic liver process without LC. Patients with enzymatic activity and with class B, C liver cirrhosis were not included in the study, due to possible complications during biopsy.

We have studied laboratory manifestations in patients with HDV infection. Average levels of biochemical parameters in patients with HDV infection (n = 32) are presented in Table 1.

TABLE 1AVERAGE INDICATOR OF BIOCHEMICAL STUDIES

BIOCHEMICAL INDICATORS IN BLOOD	NORM	PATIENTS WITH HDV INFECTION (n=32)
ALAT, MMOL / L	BEFORE 0,68	0,74
ASAT, MMOL / L	BEFORE 0,45	0,34
TOTAL BILIRUBIN, MCMOL / L		21,3
TOTAL PROTEIN, G / L	64-83	62,3
GLUCOSE		4,1

In the group of patients (n = 32), the mean ALT levels were 0.74 mmol / L, AST 0.34 mmol / L, total bilirubin 21.3 μmol / L, which indicates the absence of cytolytic syndrome. In the group of patients, the level of total protein was 62.3 g / l, which indicates a slight decrease in the protein-synthetic function of the liver.

So, in all examined patients (n = 32), the PCR study for the presence of HBV DNA in blood plasma, the results showed the absence of HBV virus DNA, which is consistent with the data of other researchers (1,2, 12,17,18,22). Liver biopsy examination for HBV DNA, these results were different. In all examined patients, it was found that HBV DNA was detected at a sufficiently high level in the liver biopsy (the average level was 61464 copies / ml). In 9 (28.2%) patients, the HBV DNA level varied 105 degrees, the average HBV DNA was 188,000 copies / ml, in 8 (25%) patients the HBV DNA level was 104 degrees, the average HBV DNA was 26,566 copies / ml and in 15 (46.8%) patients, HBV DNA varied 103, the average HBV DNA was 3640 copies / ml, which indicates intensive replication of HBV DNA in hepatocytes in the absence of HBV DNA in blood plasma in these patients (Fig. 1).

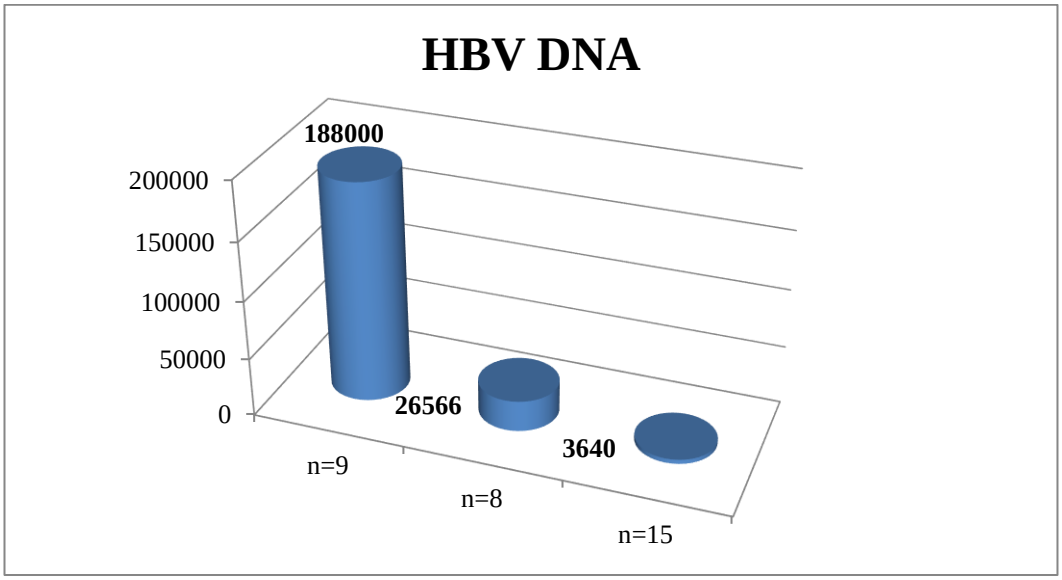

Fig. 1. HBV DNA level in liver biopsy specimens in patients with HDV infection in the absence of it in blood plasma (n = 32).

Despite the induction of endogenous IFN β and λ HDV in the hepatocyte by the virus (1,6), suppression of HBV DNA replication does not occur in our studies, which indicates the presence of a sufficient amount of HBV DNA in hepatocytes.

The absence of HBV DNA in blood plasma is explained by the fact that both HDV and HBV genomes continue to replicate in the infected nuclei of hepatocytes, along with this, the synthesis of HBsAg in minichromosomes (ccc DNA) continues. The HBV and HDV genomes require HBsAg to be released from the hepatocyte. Replication of HDV RNA is faster than replication of HBV DNA, since the hepatitis B virus genome is a double-stranded circular DNA of about 3200 nucleotides in length (2), and the size of the HDV genome is only 1672-1697 nucleotides (5), which indicates the possibility of faster replication of HDV than HBV. Thus, the HDV genome consumes more HBsAg and faster than the HBV genome. Due to the lack of HBsAg, the HBV genome remains in the cell, since HBV DNA must be wrapped in its "surface" antigen (HBsAg) to leave the hepatocyte. Thus, HBV DNA accumulates in the hepatocyte, without penetrating into the sinusoids and into the blood. This mechanism can explain the absence of HBV DNA in blood plasma in patients with active Delta infection.

To assess the effectiveness of AN therapy, we studied the viral load in HBV DNA in liver biopsy specimens of patients with CVHB and D with negative PCR for HBV DNA in blood plasma.

It was found that in 18 patients taking tenofovir disoproxil fumarate 300 mg / day, the average level was 10895 copies / ml. and ranged between 10^3 and 10^4 degrees. In 6 patients taking antiviral therapy, HBV DNA was 10^4 degrees and the mean HBV DNA level in liver biopsy was 25083 copies / ml. In 12 patients receiving antiviral therapy, HBV DNA in liver biopsy was 10^3 degrees and the average level was 3801 copies / ml. In patients who did not take tenofovir disoproxil fumarate, the amount of HBV DNA in the liver biopsy ranged between 10^4 and 10^5 degrees, and the average HBV DNA was 126501 copies / ml. (Fig. 2.).

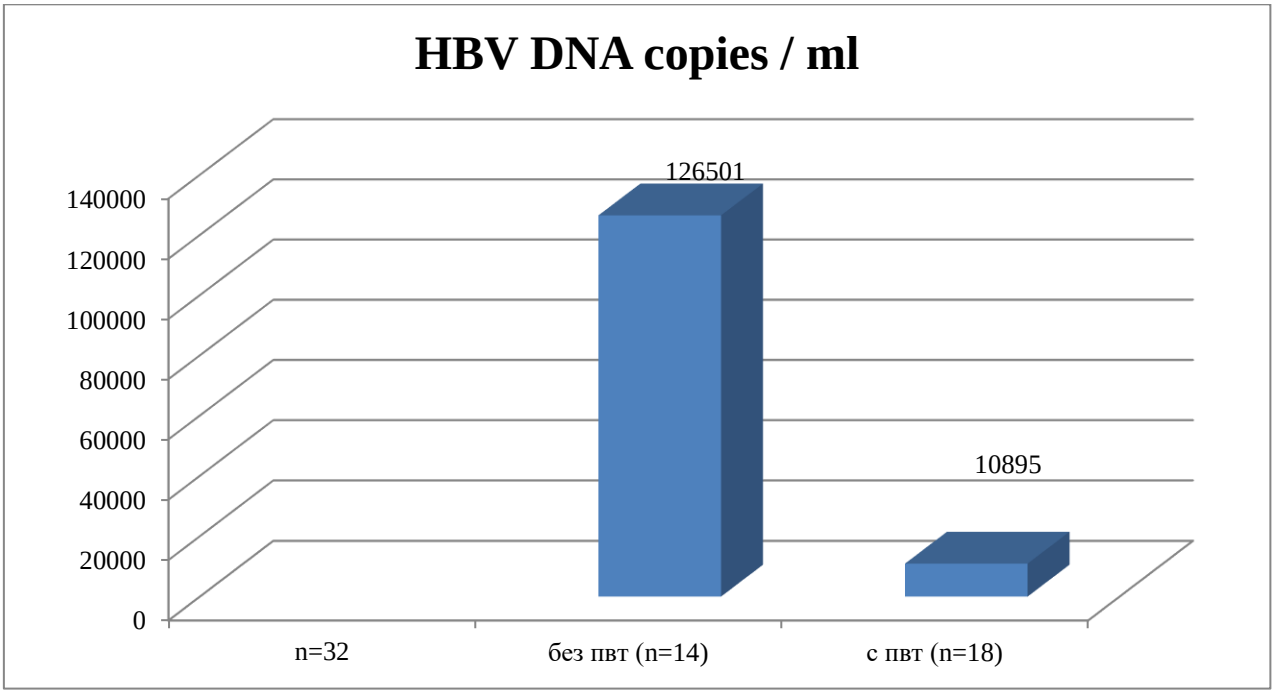

Fig. 2. HBV DNA level in liver biopsy specimens in patients with HDV infection, depending on the use of AN (n = 32)

From the above, it follows that patients with HBV and HDV coinfection are justified in the appointment of antiviral drugs (AN) to suppress HBV DNA replication..

CONCLUSION

1. In patients with HBV and HDV coinfection, liver biopsies show a high content of HBV DNA. In HBV and HDV coinfection, the absence of HBV DNA in the blood is not evidence of the absence of HBV DNA replication in hepatocytes.
2. In patients taking antiviral therapy - tenofovir disoproxil fumarate 300 mg / day, the average level of HBV DNA was 10895 copies / ml, while in patients who did not take antiviral therapy, the average level of HBV DNA was 126501 copies / ml, which exceeded 11.6 times relative to those taking antiviral therapy.
3. Patients with co-infection with HBV and HDV in the presence of the amount of HBV DNA in the biopsy specimen, it will be reasonable to prescribe antiviral drugs (AN) to suppress HBV DNA replication.

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SEMANTIC-PHONETIC FEATURES OF SOME PHRASEOLOGISMS IN THE KARAKALPAK LANGUAGE

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ABSTRACT

Phraseologisms in the Karakalpak language are the most unique and wonderful manifestations of his vocabulary, language art, language skills and eloquence, in common, art of speech. Phraseologisms can express all aspects of a person's life, artistically reflect his life, customs and traditions, views on the environment. Therefore, they live as an integral part of folk culture and spiritual life. Phraseologisms are characterized by phonetic harmony, structure, meanings, stylistic differences and a number of other differences. The article deals with the issues of artistic formation of repetition of identical or similar sounds in the beginning of the word in the components of some phraseology in the Karakalpak language and their relation to the meaning.

KEYWORDS:*Phraseologism, Sound (Phonetic) Repetition, Phraseological Meaning, Alliteration, Assonance.*

INTRODUCTION

The Karakalpak people have a unique ability to spell words, to change and use words by artisticizing, idioms, sharpening the meaning, to wrap the word with emotion where it is needed, to make a "good word - the food of the soul", to tell the word where necessary and to reach the listener to his place , all of them are wonderful and priceless manifestations of Karakalpak art of speech, among which the phraseologies created by the people is a unique, very impressive, uniquely artistic, very figurative example of this art. Phraseologisms are the pride, beauty and wealth of the national language. Phraseologisms, which is one of the most valuable and precious vocabularies for the Karakalpak nation, have its unique beauty and sharpness of meaning, richly varied, figurative meaning and figurative with phonetic decoration, as well as its historical feature related to the far past and complex quality and a wide variety of symbols. Phraseologisms, which are inextricably linked with the language, culture, literature, history, spiritual world, all aspects of life, are an indispensable tool for the speaker and listener, writer and reader, and a unique way of depicting and decorating ideas. There is a great opportunity to convey ideas clearly, concisely, sharply and effectively through phraseology. Masters of speech skillfully use such artistic opportunities, enrich the language of their works, and create an impression. For example: Zhas basima “Biy bolayin” degen zhok edim, gilen zhasi ulkenlerimizdin akmakligi, ***komeshine kul tarta bergenligi*** tilimdi qishita berdi, buginin korip,

ertenin kormegen adamnin qoriqpaq kerek, goshshim, sondaylarga soyley – soyley tilim shigip ketti (I didn't say "May I be Biy (Chief)" when I was young, the stupidity of our elders, their ***thinking only themselves*** made me tell, you should be afraid of someone who sees today and does not see tomorrow, my dear, I become rude after speaking at them much. (Sh.S.) Komesh found in the component structure of the phraseologism is an old word (archaic) from the modern point of view in the Karakalpak language, the meaning of which is given in the explanatory dictionary as follows:

“Komesh. noun. A small loaf of bread baked in a box. Har Kim oz komeshinin tez piskenin tawir korip, shoqti oz komeshine kop tartadi (Everyone likes that their bread bakes quickly and pulls fire to their bread). (A. Dabylov) 2. Own profit, own benefit. Oz komeshine kul tartiw means is to think of one's own profit, one's own benefit. " [4,15] By paying attention to the origin, emergence and development of phraseologies, most of them are initially free vocabularies, in which the signs, things or actions specified in those vocabularies are performed, and over time, they have changed into a figurative, portable phraseologism. In fact, it can be seen that the desired action, performed for a specific purpose, has moved to another variable meaning and has made a phraseological meaning. Therefore, the construction of vowel combinations in such phraseologies, in some cases, the same or similar sounds, is closely related to their meanings. Here the main necessary thing, tool for komesh and it’s cooking – kul is similar with the phonetic aspects of the word, which also includes the influential, figurative, variable aspects of the formation of phraseologism. Thus, all of this forms a coherent phraseologism. Such phraseological units in the Karakalpak language differ with their specific artistry, role and function.

“Phraseologisms are a product of folk education. Therefore, they reflect a clear place, the economic system, history, culture, way of life, customs of the people, worldviews of linguists, and so on. The emergence and formation of phraseologies is associated with certain historical processes, social center, political and spiritual views. Therefore, the study of phraseologies from a historical point of view gives good results. ”[5,231] Also, the study of other characteristic features of phraseology allows to reveal their specific nature in a single, unified form.

The sound artistry and sound harmony in such stable units are found in phraseologisms which diverse by semantics. For example: Birak, hesh kanday ***basi bayli*** zhuwmakka kele almay-ak koydik. (But we could not come to any ***total*** conclusion). (O.Kh.)

Taban tirep oz dalasina,	**struggled** on his field,
Massagetler – shol barisi,	Massagets are a desert leopard
Ulli darya zhagasinda	On the banks of the great River
Turdi soytip kasarisip.	Stayed being stubborn. (I.Yu.)

“In most cases, it is possible to enter another word or words between the components of a phrase. In this case, the syntactic form of the phrase expands. However, in this way, its semantic integrity and the weight in which it acquires the status of a phrase are preserved”. [11, 19]. In this case, the speaker or the writer aims to distinguish something, and emphasize it. For example: Hatteki, “gawashalardin soliwina tiyim saliw sonin gana **kolinan keledi**” dep te oyladi (he even thought that "this is the only he is **able** to stop the extinction of gourds)" (O.Kh). Agronomlardin, ilimpazlarin **kolinan** bu isti duzetiw **kelermeken**? (Will agronomists and scientists **be able** to correct this work?)(O.Kh). And the following phraseology, which came with this **kol** component, has a different meaning: - Ilazh zhok. Ne desen de **kolin kelip tur**, - dep moyinladi Hakimbay (There is no cure. Whatever you say, you **win**, - admitted Hakimbay) (J.H). This phraseology means "koli kelip tur – luck, success" [7,113]. There are other phraseologisms that combine this word kol with other parts of body in sound combination. For example: Zhahangirdin egini

pispey, **kuri kol** pisi kurip kaliwga karaganin kaladagi zher bolimindegiler de, “Soyuz kosshinin” adamlari da biletugin edi (Both the people in the land department of the city and the people of the "Union Army" knew that Jahangir would be upset with **empty hand**, not growing his crops) (O.Kh). Olay bolsa, minekey, **tort koz tuwelmiz**, kapir ham kudaydan bezgen Zhahangirdin gellesin kim aladi? – dedi azgantaydan son bir shokip, eki karagan karakshi hakkedey tum-tusina zhalt-zhalt karap. (So, now, we are **together**, who will take the head of Zhahangir, infidel and atheist? - he said after a while, glancing like a pirate magpie that once bite, looked twice)(O.Kh). Kempir **tobeden tuskendey** birden bina bolgan bul hadiysege gubir-gubir tonkildandi (The old woman **suddenly froze** at this event and said to herself loudly). (O.Kh.) Erten azannan baslap Zhahangirdi atyzda korinler. Sondai isleimen, eger tanlaylarynyz takyldamasa, magan kelinler ... (See Jahangir at the field from the morning tomorrow. I’ll do , if you aren’t surprised, come to me…) (O.Kh.) Gey birewler patefonnan kozin almay, **awzin aship kaldi** (Some people **amazed** not taking their eyes off the gramophone. (O.Kh.) Here effectively conveys the meanings: kuri kol means empty hand, tort koz tuwelmiz - "everybody is here, everybody participate", [2,145] tobeden tuskendey - suddenly, tanlaylariniz takildamasa - not to be surprised, awzin aship kaldi – to be amazed.

In the components of some phraseologisms in the Karakalpak language, the artistic formation of repetitive identical or similar sounds at the beginning of a word is recognized as one of their differences. This requires not only the simple set of sounds, but also the combination of semantic and vowel combinations, thereby preserving the integrity of the phraseological meaning. Phraseologisms of this nature are distinguished by their semantic and phonetic art. For example: Bunin astarinda bir gap boliwi kerek, koyip tura ber, **Aytannin tarpiwina tussen** ele sen-am kizik bolasan!(There must be something behind this, just put it down, if you **fall under Aitan’s pressure**, you will be funny too!) (M.N.) In this case, the phraseology tarpiwina tusiw - means to fall into the hands of a person, to fall under pressure, to be biased, to relate, to submit to him in some way. And the phraseology takimina tusiw - means to belong to one person, to submit to his domination, to have his will, power, freedom in his hands, to be in his hands, for example, to be in his hands out of helplessness and to be in his marriage: Men bolsam, naylazhliktan Kalimbet baydin takimina tustim. (I’m, out of desperation, in Kalimbet bay’s hand). (O.Kh.)

There are several other (non-euphonic) phraseologies associated with this word takim. For example: Bul zhuwaday solgir, zhalgizimdi **takimina basip**, kokpar oynagani azday, ozin kok ala koyday etip sabagan, kaynaga! (The scoundrel **crushed my only son**, he not only played kokpar, but also beat him like a blue white sheep, brother-in-law!). (J.S.) Endi on zhildan keyin ozindi **takimina baspaydi** dep oylaysan ba? (Do you think that in ten years you will not **be suffered**?)(J.S.). Koli kizilga tiygen zhengen agana **takim burawdi salmas** pa eken? (Wouldn't your sister-in-law who had a daughter-in-law **excruciate** your brother?) (K.S.). – Balam! – dedi Allamurat suwpi, Eshbayzhannin **takimi bos kaldi**. (- My child! - said Allamurat Suupy, Eshbayzhan has no close friend). (J.S.)

In connection with the word takym, I. Kenesbayev explains the meanings of the following phraseologies in the Kazakh language: “takimga aldi – to be confused; takimga basti - 1. rode (the horse - B.Yu.); 2. turned; takym zhazdi - means to walk; takim kakkizbadi - it is said that the horse is fast and does not hit the whip; takim saldi - rode a horse; takimi tolari zhok -There is no one who is grateful and satisfied; takimi zharimagan - old. in the sense that the wife is unstable; takimi [atka …] zharimadi - there was no riding vehicle; takimi keppes uri – enterprising thief; takimina at tiydi – to have a horse under him; takimi tartti - a word that symbolizes a folk ritual (meaning "to have a horse", "Someone meets a woman"); takimi tolmadi - disregard . [3,488-489] In the examples, takimina basip - crushing, tormenting, subjugating, takimina baspaydi dep oylaysanba - not to humiliate, not to torment, not to take revenge, takim burawdi saliw – torment, excruciate, investigate, takimi bos kaldi - in accordance with the context, not to have a

secretive, sympathetic friend, a close person; and means that to have no one, that he could compete, that he was equal to himself. In such phraseologies, the national spirit is clearly felt.

J.B. Satkenova, N.K. Bisegalieva: “Every writer uses linguistic descriptive tools to convey the image of the hero and his true nature. However, the writer analyzes and selects them according to his stylistic and linguistic tastes. In particular, the role of phraseology in the use of the writer, in the image of the hero of the author's use is special. Artistic devices allow to accurately conveying the character's behavior, psychological state, and emotions". [9,215]. Narbay **salisi suwga ketken kisidey sam-saz bolip, kabaginin astinan karap** tur eken (Narbai looked under his eyebrows **as if he was thinking deeply**). (O.Kh) Jahangir ozinin katalligin da, ogiri ojetligin de, geyde adamlarga **katti kayirim soz** aytatuginin da, soytip, kopshilikti irenzhitip zhurgenin de sezbedi. Ati salgan zherden zhorgalap, hesh kim betine zhel bolip tiymegen son, ol ozinin **katti ketkenin** kaydan bilsin? (Jahangir did not feel his cruelty, his stubbornness, **his harsh words** to some people, and his disgust with the masses. How could he know that he **had gone so far** as nobody touched or spoke him at face?) (O.Kh.)

The people have formed many idioms based on their life experiences. Phraseologisms serve as an important tool in the implementation of his ideas, reflecting the views of the people on life, person, the environment. Among them, the phrases of euphonic nature, which have sound repetitions in their components, are known for their special artistry and expressiveness. For example: Qalay degen menen ol **ko’pti ko’rgen**, ko’p biletug’in haqiyqat diyqan adam. (He is a truthful farmer who has **seen a lot** and knows a lot). (O.Kh.) Bilsem ozinnen **bir ko’ylek burin tozdirg’andi** ko’rsen, onin menen so’ylesip ken’es soraw, hal-jayin biliwge qiziqsiniwin kishi peyilligi g’oy” dep oyladi ol jo’ninde. (I know that if you see **older than you**, it is humane to talk to him and ask for advice, to be interested in the situation”, he thought about it). (O.Kh.) Jahangir o’mirinin ko’binshe **aytqani aytqan, degeni degen bolip**, o’jet ha’m g’iris o’sti. Asirese, uyinin’ ishinde hesh bir bende onin’ aytqanin tin’lamay, hesh adam **so’zin sindirg’an emes**. (Zhahangir's life was mostly as he **had everything he wanted** and grew stubborn and rude. In particular, no one in the house listened to him and **did not refuse his word**). (O.Kh.) Hayalinin’ **otirg’an jeri oziniki bolip**, boyin qiya tasladi da, darhal uyqig’a ketti (As his wife's **too tired**, she fell down and immediately fell asleep). (O. Kh) Birewler “Bul tuqim shigitten kelgen ba’le” dese, ekinshi adam “Joq, olay emes, ba’le jerdin’ o’zinen” dep, har qiyli pikirlerdin’ basin shatpaqlap, **siniqqa siltaw** izledi. (Some said “this trouble is from the crop seeds”, another man said “No, not like this, trouble from the earth itself”, thought all the opinions, and **looked for the reason**). (O.Kh.) In this case, the **ko’pti ko’rgen** (see a lot) alliterative phraseology is used as a synonym for a **ko’p biletug’in** (know a lot), but in addition to this meaning, the meaning of an older, more experienced is meant by the phraseologism **o’zin’nen bir ko’ylek burin tozdirg’an**. And the unit of **aytqani aytqan, degeni degen boliw** is an equal two-component phraseologism – has an alliteration-assonant feature, **so’zin sindirg’an emes** - it means that the word has not been refused, it has been fulfilled. The meaning of extreme fatigue is expressed through phraseologism **otirg’an jeri o’ziniki bolip**, which is told to a person (mostly women) who is not active, not quick, and moves slowly and heavily. Siniqqa siltaw izlew - is phraseologism in the sense of restraint, finding a reason, searching for a reason, all of them are impressive not only by the semantic, but also by the phonetic artistry.

"Euphony is created by the repetition of same sounds or groups of sounds." [10,23] Euphony in phraseologies increases their effectiveness and imagery. For example:Taqir jerden shan’

shig'arip, jesir dawi barma, urisqan barma, talasqan barma, solardi dawg'a aylandirip, birnen'e shig'arip juriw kerek, bolmasa **qazan qaynamaydi**. (Makes trouble from nothing, if there's a widow, blusterer, arguing man, turned all of them into quarrels and it's necessary to make something, otherwise **there's nothing to eat**). (K.A.) Ol jayga siymay ketti. **To'rt diywal to'rt ta'repinen qisip baratir**. (He could not fit in the room. He **is getting bored**). (K.S.) Xaliq **qulaq qoyip** tin'lay beredi. (The people will listen **attentively**). (K.S.) Biyil enesi qaytis bolgali Biybirawshan atasinin' awizina qarawdi urdiske aynaldirgan edi. **Aytqanin xat penen qalemdey** koredi. (This year, after the death of his mother-in-law, Biybiravshan made it a habit to listen to his father-in-law's mouth. She considers everything **what he says as a rule**). (K.S.) **Orninan o'rre turdi** da, sirtqa zip berdi. (He **got up** and ran out). (K.S.) **Jo'ndi-josaqti bilmey**, halalani sala beredi (He does **not know the situation** and continues to make a noise). (K.A.)

Some proverbs in the Karakalpak language are used in a phraseological sense, as well as phraseological expressions of gratitude and cursing, built on the harmony of some phonetic harmony, are characterized by their sharpness and special impact. For example: En' bolmasa **quwis uyden quri shiqpay**, nan awiz tiysin, bala paqir. (At least he should have a little bread without leaving the house with empty hand, poor child). (O.Kh.) – Qoy, kempir, sen olay deme. Ko'zimnin' tirisinde ma'n'gi birge bolasan', bilsem. Sol ushin "erli-zayipli, **qosag'in meneb qosa ag'ar**" deydi. (No, my old lady, don't say that. I wish we were together forever when I'm alive. That is why it is said that "a couple should be old equally, live together until both of them die). (OKh.) **Topirag'I torqa bolg'ir** paqir murap edi g'oy. (he was worker, may his place be in heaven). (K.S.) **Jatqan jerlerin' jariq, topiraqlardin' torqa bolg'ir** ag'alarim-ay! (**may your places be in heaven**, my brothers!). (K.S.)

"The phraseologisms which is different with its imagery is a distinctive manifestation of the language of each nation. The very widespread use of the phraseologisms in the literary work reflects the national identity". [8,40] Such phraseologies are also part of the national language of the Karakalpak people. They are impressive and artistic, both in meaning and sound. For example: Burin bolg'anda g'oy **bastiriliwli qazan bastiriliwli qala** berer edi (In the past, **a closed pot would remain closed (all secrets would be saved**)). (K.S.) Hayali da ser salip edi, **juregi suw ete** qaldi. (When the wife also glanced, his **heart was cold (afraid)**). (K.S.) Jan'g'izinin qanli maydang'a atlanar aldi alti qanatli uyge bir o'zi siymay poshalap, **ingendey qayisip, botaday bozlap otirg'an** Nazli kempir juregindegi da'rtine usinnan basqa shipa taba almadi ma, kim bilsin, qiza kele aytinip jiladi. (Before going to the bloody battle of Zhangyzy, **poor crying** Nazli old woman, who was alone in a six-roomed house, could not find a cure for her heartache, who knows, she cried). (KS) Sonnan son' "**o'lim-o'lim bir o'lim**" dep aqsaqal bolistin' qorlig'ina ko'nbey qarsi boldiq (Then we protested against the humiliation of the aksakal, saying "**death is death**"). (K.A.)

In the Karakalpak language there are such phrases as **tuyeden postin taslag'anday, at-tonin al qashadi, tonin teris kiyiw** and others in connection with the words of the ton, skin of the animal. They are used by masters of speech in the literary works with some changes for the stylistic purposes. For example: Geyde **at-tonin teris awdarip kiygen** ba'le meterge uqsap ketedi. (Sometimes he looks illness which is **angry**). (K.S)

The skill of the people in life is clearly reflected in the phraseologies created similar to the convenience or inconvenience of using something, or in comparison with it. For example: Qap, **quyisqang'a qistirilg'an tezektey bolip**, bul da qalmadi aw, bir jag'imizdan. (A bag is **like stuck to the bent**, and it's not also left, on the one hand. (K.A.) In various literatures, the word "bent" is interpreted in connection with the horse's bridle: "the bent means it's hanged loosely to the horse's tail in order not to move the saddle forward [12,293]. "Quyisqan - it's hanged loosely to the horse's tail in order not to move the saddle forward. It is used in some dialects of the Kyrgyz language in the form of "quyushqan "[1,114]. "Also, in order to tie the saddle, the naked body of the horse is covered with sweat, on the sweat the pillow will be put, in order not to hurt the horse's skin the girth will be tied, and the bottoms are tied, and at the end it's tied with bent [6,27]. As it is known, this phraseology, which appeared in a variable sense due to the fact that the dung is stuck to the bent, cause inconvenience, lack of opportunities to do something, something is attached, something is added, carrying something that is not needed, not to let to do something, in the sense of obstruction.

Thus, phraseology is an artistic example of the vernacular and differs as a means of expressive and effective communication. They are especially impressive and figurative, as well as also become artistic with the repetition of similar or identical sounds. The study of phraseologisms based on such phonetic artistry in the Karakalpak language, and their evaluation from a phonostylistic point of view revealed one of their individual features.

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A GLANCE AT THE SECURITY RISKS ASSOCIATED WITH CLOUD COMPUTING

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ABSTRACT

Cloud computing has gotten a lot of attention in the new age of IT technologies because of the growing need for services or utility computing all over the internet. The security risk posed by resource sharing in cloud computing has emerged as one of the most difficult issues to address when offering powerful processing and storage as on-demand services. Governments and businesses all over the world are encouraged to develop or move to the cloud because of the cheap cost associated with the increased efficiency and performance enabled by cloud computing. However, there are still a number of technological problems related to cloud computing's features and the supply of high-quality service, causing a delay in cloud adoption. The security dangers and difficulties of cloud computing are highlighted in this review paper, as well as the security requirements for cloud computing. The main goal of this study is to categorize the security risks and difficulties associated with various types of cloud computing (SaaS, PaaS and IaaS).

KEYWORDS: *Cloud Computing, Cloud Security, Infrastructure As A Service (Iaas), Platform As A Service (Paas), Software As A Service (Saas).*

33. INTRODUCTION

Cloud computing has exploded in popularity, with Microsoft, Google, and a slew of other companies migrating to the cloud in recent years. Cloud computing is the separation of software from the operating system and hardware, and it is not the same as virtual computing. Because the program is no longer reliant on the hardware or operating system, it will automatically move to alternative resources if they fail. The word "cloud" refers to a distant datacenter, according to a researcher[1]. It also has two interpretations. The first is the use of a Web browser to access information and data resources on the Internet. The second option is to pay for computer resources depending on their use. The National Institute of Standards and Technology (NIST) defines cloud computing as a model for providing universal, suitable, on-demand network access to a pool of configurable computing resources (e.g., servers, networks, applications, storage, and services) that can be quickly released and provisioned with minimal management effort or service provider interaction[2], [3]. Furthermore, Gartner describes cloud computing as a kind of

massively scalable computing style that allows competent and deliverable IT as services to external consumers through internet technologies. Another researcher defines cloud computing as the infrastructure paradigm change that allows SaaS to rise to prominence. It's a collection of web-based services targeted at allowing consumers to get a wide variety of functional capabilities on a pay-as-you-go basis, which traditionally required significant hardware/software expenditures and professional expertise to achieve. Furthermore, one author defines cloud computing as a storage system that allows users to access files from anywhere on the internet using any technology by storing data on a cloud server rather than a conventional computer.

For hardware and server virtualization, cloud computing employs virtualization techniques as well as automated decision-making. Instead of executing one application on a server using conventional servers, cloud computing offers clients with a virtual infrastructure where they can simply store and execute software while sharing server resources for many applications utilizing virtualization methods. Using a hypervisor to perform virtualization, it is feasible to run many programs on a single server. Cloud services include Outlook, Facebook, Gmail, Google Docs, and YouTube[4]. Cloud computing is a term that refers to services that are provided via the internet.

Measured service, wide network access on-demand self-service, fast flexibility, and resource pooling are the five fundamental features of cloud computing. It is intended to improve the efficiency and performance of computer systems while reducing costs. According to a study, 91 percent of organizations and businesses in Europe and the United States choose to move to the cloud because of the cost savings enabled by cloud computing.

34. DISCUSSION

34.1. Cloud Main Forms:

Based on the kinds of services they may offer to clients, cloud computing systems can be divided into three groups. Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) are the three types of services (IaaS)[5]. The following are descriptions of the three kinds of services.

34.1.1. Software as a Service (SaaS):

It is a kind of cloud computing that offers end users services such as applications, computational processes, and storage, all of which may be accessed remotely[6]. Fixed subscription and usage-based price plan models are two examples of cost plan models for such a service. The program may be operated via a network, with a thin client serving as the user interface. Table 1 lists some examples of SaaS providers.

TABLE 1: ILLUSTRATES THE LIST OF SOFTWARE AS A SERVICE (SAAS) PROVIDERS ALONG WITH THE SERVICES OFFERED BY THEM[7].

Name	Service provided
Drobox and SkyDrive from Microsoft	Files and folders storage service
Salesforce	Online CRM (Customer Relationship Management)
Live Mesh from Microsoft	Files and folders to be shared and synchronized across multiple devices.
Outlook from Microsoft	Email and documents processing service
Open ID and OAuth	Identity service
Amazon Simple Queue Service	Integration service
Google Maps, Bing maps and Yahoo! Maps	Mapping service
Google Checkout, Amazon Flexible Payments Service, PayPal	Payments service
Google Search, Yahoo! BOSS, Alexa	Search service

34.1.2. Platform as a Service (PaaS):

It's a kind of cloud computing service that gives developers a highly integrated environment in which to create, test, and deploy practice applications[8]. However, there are certain constraints that developers must consider when deploying software in this kind of service and trading software scalability for software scalability. PaaS providers are included in Table 2 as examples.

TABLE 2: ILLUSTRATES THE LIST OF PLATFORM AS A SERVICE (PAAS) PROVIDERS ALONG WITH THE SERVICES OFFERED BY THEM[8].

Name	Service provided
Google's App Engine	Build Web applications and its Web application frameworks
Godaddy	Build Web applications and hosting
Heroku	Ruby on Rails for building Web applications
Mosso	Web hosting
Microsoft Azure	Proprietary
Force.com	Proprietary

34.1.3. Infrastructure as a service (IaaS):

It's a kind of cloud computing that focuses on providing IT for system administrators by supplying hardware, software, and equipment to provide software application environments with a resource usage-based pricing model[9]. IaaS may automatically scale up or down in response to an application's resource requirements. With a fixed utility price model, IaaS computing processes and storage infrastructures are accessible to the public.

34.1.4. Anything(X) as a service (XaaS):

It is a subset of cloud computing that was originally defined in 2008. It all comes down to sharing the hardware's capabilities with the software[10]. Network as a Service (NaaS), Database as a Service (DBaaS), Monitoring as a Service (MaaS), Desktop as a Service (DaaS), and

Content distribution as a Service are just a few examples of what will be feasible and achievable via virtualization.

34.1.5. Component as a service (CaaS):

It has to do with services that offer an API for web services so that they may be used as a component. CaaS, for example, may be offered as end-to-end business services through their API's SaaS services.

34.2. Types of Cloud:

The customer may select from a variety of cloud computing architectures, based on the hardware and software required as well as the pricing. In general, cloud architecture is as follows.

34.2.1. Public Cloud:

This kind of cloud computing architecture is designed for clients as a consumption plan payment model with a pay-as-you-go payment mechanism. Google App Engine, Microsoft Azure, and Amazon Web Services are examples of this kind.

34.2.2. Private Cloud:

This cloud computing architecture is designed for essential infrastructure as well as private businesses and organizations. This kind of cloud computing environment is not open to the general public. Commercial clouds include data centers for private businesses and government data centers.

34.2.3. Community Cloud:

It's a robust infrastructure that allows a third party to offer applications and platforms on which new services may be built, and it includes a variety of parties.

34.2.4. Hybrid Cloud:

The public and private clouds are combined in this kind of cloud computing architecture. The National Institute of Standards and Technologies (NIST) defines it as a hybrid cloud that combines public and private clouds and connects them using standardized or proprietary technology to allow data and application mobility.

Cloud computing, also known as utility computing, has exploded in popularity thanks to a slew of new service providers. These service providers provide on-demand cloud computing services, such as virtual servers and storage, allowing many consumers and businesses to migrate to the cloud and benefit from elastic and adaptable services.

The development of the wide global web, on the other hand, has aided the rapid increase of on-demand applications in recent years. The likelihood of cyberattacks has been steadily rising. As a result, security concerns about the risk factors for today's cloud computing architecture must be considered. As a result, the goal of this research is to bring attention to the present cloud computing architectural risk factors and associated problems, which are listed below.

34.3. Attacks And Threats In The Cloud Security:

The following are examples of cloud security assaults and threats:

34.3.1. Abuse And Nefarious Use Of Cloud Computing:

Assailants may utilize cloud computing capacity for cloud infrastructure to attack targets with spam and malware, such as botnets. It is the biggest security threat in cloud computing, according to the CSA.

34.3.2. Account And Service Hijacking:

It's one of the most dangerous security risks. It occurs when attackers plan to hack a web service on a website housed on a cloud server or service provider's infrastructure, then install their software that controls in the cloud provider's architecture.

34.3.3. Backdoor Channel Attacks:

This kind of attack occurs in IaaS when it provides a high degree of penetration to an effective user on the VM or Hypervisor level. This may have an impact on service availability and data security.

34.3.4. Cross Site Scripting Attacks:

It's also known as XSS. It's one of the most powerful security flaws discovered via online apps. The Java script language is one of the most often utilized scripting languages in such attacks.

34.3.5. Denial Of Service Attacks:

The service will not be accessible when the users plan to request it from the server in this kind of assault. They'll receive the 404 error, which means the service isn't available.

34.3.6. Cloud Malware Injection Attack:

This is one of the most dangerous cloud computing security threats, with the goal of injecting malware, macules applications, or virtual machines into the cloud architecture.

34.3.7. Insecure Application Programming Interface:

When service providers offer services to consumers through APIs, the APIs are encrypted with secure authentication, and secure access control and activity monitoring methods are included.

34.3.8. Metadata Spoofing Attack:

The web services providers provide the service metadata document to the client system, which contains all of the information about the service invocation, including security requirements, message format, and network location. The attacker's goal in this instance is to reengineer the web service metadata descriptions by requesting that the network references and endpoints to the security policies be changed.

34.3.9. Man In The Middle Attacks:

The hacker establishes an independent link between the client and the service provider in order to monitor the data and information for the service without the customer's awareness.

34.3.10. Malicious Insiders:

This kind of security danger occurs when there is a lack of security concern for how workers may use the service provider's virtual cloud assets. Because of the employee's privilege in not implementing in the cloud system and updating the responsibilities when their behavior or work changes, this danger may be more complicated.

34.3.11. Shared technology’s vulnerabilities:

This problem arose from cloud computing, which makes use of internet infrastructure that is shared across cloud clients. As a result, all of the existing issues with internet infrastructures will be transferred to the cloud. Traditional components, on the other hand, have not been designed to share resources in cloud computing systems.

34.3.12. Phishing Attack:

It's about invading the privacy of users and exposing their data and information by enabling them to visit a phony web link placed on their computers: malicious malware exposes that data.

34.3.13. SQL Injection Attacks:

This kind of problem occurs when hackers attempt to attack a website's database by injecting code into SQL statements through website query techniques, which may disable a website's security.

34.3.14. Sniffer attacks:

The attacker aims to read the content of the network packet in this kind of attack, even if no encryption techniques were used during the data transmission. Sniffer may be a program, a gadget, or a script.

34.3.15. Security concern with the virtual machine Manager:

The kind of security issue is that service providers must be very cautious about the services offered by VM technology to consumers since this technology has certain security flaws in some instances.

34.3.16. Zombie attack (DoS/DDoS):

It occurs when hosts are flooded indirectly or directly at the Hypervisor, Network, or VM level. It has the potential to disrupt service availability and establish a user account for unauthorized service use.

34.3.17. Unknown risk profile:

This kind of security danger arises as a consequence of focusing on the capabilities and features obtained from using cloud services without taking into account the security technologies and products that will be created. The issue is that third-party data may be accessed by features, and that this data may be released for any reason.

34.4. Cloud Computing Challenges:

34.4.1. Accounting:

In order to maintain network management, it is one of the important elements that must be evaluated while implementing services in cloud computing systems.

34.4.2. Access controls:

It is a problem for all service providers since it may lead to a security breach by exposing customer data and allowing hackers access to the organization's infrastructure.

34.4.3. Compliance:

Cloud computing has a flaw when it comes to enabling compliance management techniques. This may result in severe data security and privacy concerns.

34.4.4. Extensibility and Shared Responsibilities:

The security issue in cloud computing must be addressed by both service providers and consumers. Until recently, there has been no clear picture of how security obligations in cloud computing would be met.

34.4.5. Cross-Organizational Security Management:

The achievement and maintenance of security standards and compliance with SLAs is a major issue in cloud computing. To guarantee that an acceptable security need in cloud computing is met, it is necessary to establish a corporation among companies.

34.4.6. Private Cloud:

Because the phrase "private cloud" means "on-premises," it's safe to assume that the working environment will be similar to conventional computing. Computing resources may be virtually extended or de-extended based on the requirements of the user by using virtualization technologies. The whole organization's departments will have access to common resources as a result of this. However, this has not yet been completely applied across a broad spectrum of businesses. In other words, it is a step in the right direction for public cloud services to take.

34.4.7. Identity management (IdM):

It is an important element of cloud computing security that aims to conduct verification and validation across diverse cloud services. However, there are still some problems with compatibility among the most recent security solutions.

34.4.8. Heterogeneity:

When many service providers offer a large number of services utilizing diverse technologies, a heterogeneous problem arises. Heterogeneity may occur as a consequence of variations in software and hardware.

34.4.9. Integration:

Customers and organizations who need to use numerous service providers for a variety of reasons must deploy and integrate software and data across different clouds. Hybrid clouds may help address this problem in certain situations.

34.4.10. Bandwidth requirements:

Organizations must analyze the communication bandwidth needs and appraise the services in terms of significant amounts of data transfer before adopting a cloud service.

34.4.11. Performance:

Although cloud computing reduces costs, performance problems such as connection time between users and cloud services have become a problem as the number of users grows, so does the quantity of information and data that must be transmitted to them. This puts a lot of strain on the hardware and software. Another reason is that the user and service providers are separated by a significant distance. Customers may also scale up their cloud infrastructure beyond their initial expectations, posing a significant issue for service providers.

34.4.12. Monitoring:

When cloud computing is built on service monitoring, there will be a huge need for monitoring to be used across all cloud services and activities, whether in public or private infrastructure.

34.4.13. Service Level Agreement:

It's an essential part of a cloud service customer's and cloud service provider's contractual relationship. Because of the worldwide nature of the cloud, SLAs often cover several countries, each with its own set of regulatory obligations, particularly when it comes to the security of personal data stored in the cloud.

34.4.14. Risk analysis and management:

It is a critical component of cloud security. It's all about reducing cloud computing's noisy capacity by screening and detecting any risks before delivering the service to consumers.

34.4.15. Virtualization:

It is a method of delivering cloud services to consumers, particularly when using IaaS services, although it still has security concerns.

34.4.16. Security in the web browser:

In terms of complicated and sophisticated banking and crucial settings for a shared solution, such as cloud solutions, the security standards in the web browser are insufficient to meet the user's demands.

34.4.17. Policies:

A well-written policy for the security processes and standards that will be applied in cloud computing systems is required.

35. CONCLUSION

Cloud computing has recently sparked a lot of attention in the business and academia, since it reflects the backbone of future contemporary civilizations. Cloud computing improves economic efficiency while lowering expenses. Governments, organizations, and businesses are seeking for cloud computing's enabling characteristics. However, without appropriate answers for a significant number of security threats and privacy concerns, cloud computing adoption will remain a long way off in the coming years. The most recent dangers and difficulties of cloud computing have been highlighted in this study. Our future study will focus on developing a security model that takes into account the highlighted threats and difficulties.

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A REVIEW OF CLOUD COMPUTING SYSTEM AND ITS SECURITY PROBLEMS

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ABSTRACT

Cloud computing has the ability to provide consumers with cost-effective and more flexible services on demand via the network. It expands the organization's capabilities without the need to hire new employees, invest in new infrastructure, or purchase new software. Because of the scalability of resources, cloud computing has expanded significantly in recent years, and it now seems to be a fast-growing sector of the IT business. By analyzing policy failure or malicious behavior, the dynamic and scalable nature of cloud computing presents security difficulties in their administration. The comprehensive design of cloud computing architecture is examined in this article, which includes deployment models, service models, cloud components, and cloud security. Furthermore, this research highlights the security issues in cloud computing during data transmission and proposes a feasible method to mitigate the possible risks. The aim of a Trusted Third Party (TTP) is to provide security features that are adequate in cloud computing. The Public Key Infrastructure (PKI) is a cryptography-based security solution that works with Single-Sign-On (SSO) and Lightweight Directory Access Protocol (LDAP) to guarantee the integrity, confidentiality, availability, and authenticity of communications and data.

KEYWORDS: *Cloud Computing, Cloud Security, Cryptography, Deployment Models, Service Models.*

36. INTRODUCTION

Cloud computing expands information technology capabilities by dynamically expanding capacity and adding features without the need to invest in big and costly equipment, software license, or new personnel training. Cloud computing offers a more flexible method to access storage and compute resources on demand, among other advantages[1]. Different business companies have increasingly realized in recent years that by utilizing cloud resources and gaining quick access, they can lower their initial business costs by paying only for the resources they use rather than having to invest in potentially large infrastructure (owning and maintaining). Rapid deployment, cost savings, and low investment are the primary motivators for many businesses to use cloud services. The National Institute of Standards and Technology (NIST) explains cloud computing as a paradigm for enabling easy, ubiquitous, and on-demand

network connectivity, with customizable computer resources that can be supplied and provisioned quickly with little administrative involvement[2].

The cloud is a collection of virtualized and linked computers that comprises of parallel and distributed systems that may dynamically present and supply computing resources depending on Service Level Agreements (SLAs) created by a settlement between consumers and service providers[3]. Infinite computing resources, cheap cost, security controls, hypervisor protection, fast elasticity, high scalability, and fault tolerant services with excellent performance are all benefits of cloud computing. Many businesses, such as Microsoft, Google, Amazon, IBM, and others, created cloud computing systems and improved their services to serve a huge number of consumers. Furthermore, there are major obstacles to adopting cloud computing, such as privacy concerns, compliance, and legal issues, since it is a relatively new computing paradigm with a considerable degree of uncertainty about the security at all levels, including host, network, data, and application. When databases and application software are moved from the cloud to big data centers, data and service management becomes a major issue. Many security issues may emerge when using cloud computing, including privacy and control, virtualization and accessibility flaws, credential and identity management, confidentiality, responder device authentication, and integrity. Because service providers guarantee a high degree of security, compliance, and regulatory compliance, the use of cloud computing and market maturity is constantly increasing. Cloud services will contribute to this expansion by providing greater flexibility and cost savings.

Cloud computing is enabled via virtualization technology, in which the host system runs a hypervisor program that creates one or more Virtual Machines (VMs) that accurately mimic real computers[4]. Any program, from the operating system to the end-user application, may be operated by these simulations. The number of physical devices in data centers is determined by the hardware level, which comprises hard drives, CPUs, and network devices. It is unaffected by the physical location that is in charge of processing and storing information as required. A mix of the virtualization layer, software layer, and management layer is used to manage the servers effectively[5]. The virtualization layer is used to offer the cloud components of fast elasticity, resource pooling, and location independence that are required. It is also a necessary component of cloud deployment. The management layer is in charge of implementing security policies and monitoring throughout the cloud.

This study breaks down cloud computing architecture into four categories: 1) cloud deployment methods, 2) cloud service model, 3) cloud fundamental features, and 4) cloud security. When data migrates to modernize cloud systems, advancements in business requirements, and the effect of services provided by various organizations to expand the market, different businesses' security issues with the rising significance of cloud resources are taken into consideration. Furthermore, this research focuses on identifying the security problems and challenges in cloud computing, taking into account threads, vulnerabilities, needs, and dangers, as well as discussing security solutions and recommendations for cloud computing. Also covered is the Trusted Third Party (TTP) in the cloud computing environment, which enables trust and cryptography to guarantee data integrity, authenticity, and secrecy while addressing particular security concerns. The proposed solution to the horizontal level services that are accessible for the relevant organizations to preserve confidence in order to implement the security mesh. Single-Sign-On (SSO) and Lightweight Directory Access Protocol (LDAP) are used in Public Key Infrastructure (PKI) to securely authenticate and identify the relevant entities.

The remainder of the paper is laid out as follows: Apart from presenting the analysis and debate based on the security problems found in the cloud computing environment, Section 2 highlights the comprehensive design of cloud computing architecture and discusses the security challenges of cloud computing. The research's findings and future work are presented in Section 3.

37. DISCUSSION

37.1. Cloud Computing Architecture:

NIST is in charge of ensuring security in the cloud computing environment as well as establishing standards and recommendations, which is an important contribution that helps people understand cloud services and computing technology better. The four deployment types of cloud computing architecture are public cloud, private cloud, community cloud, and hybrid cloud. The deployment models describe the many ways in which cloud services may be delivered via the computer infrastructure. Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) are the three cloud service types or delivery methods accessible to customers. In a cloud environment, various degrees of security are needed for these service types. The cloud basic characteristic layer considers a broad variety of services that may be utilized over the internet. Services, resource allocation management, and security are all provided by the cloud service provider. The architecture describes the five main components, which are made up of cloud-based services. When transferring data or shared resources to the cloud using a client-server architecture, cloud security is a critical and difficult job. The architecture of cloud computing is shown in Fig. 1, and the following elements are discussed:

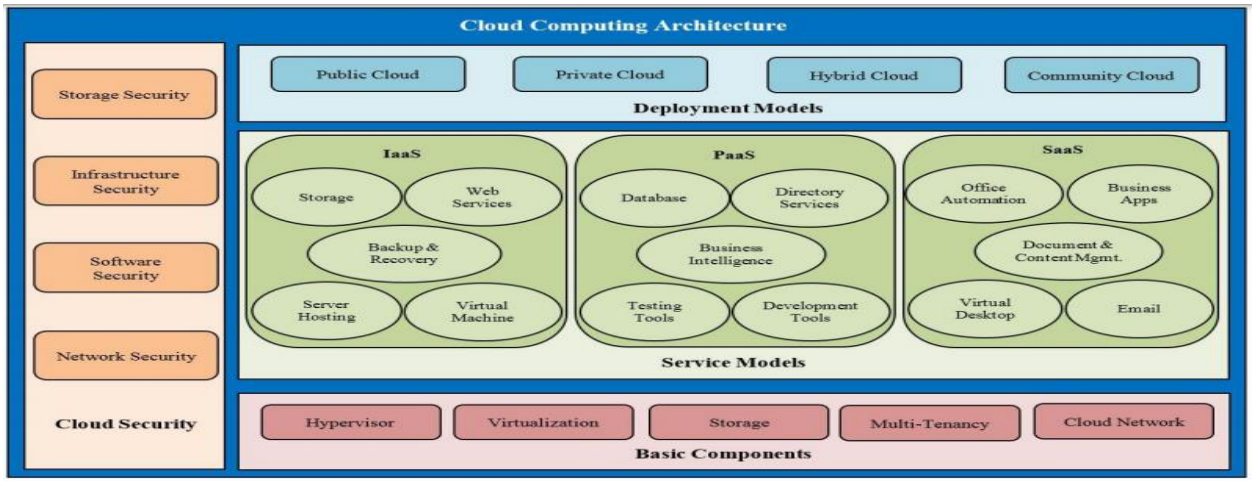

Fig. 1: Illustrates the Cloud Computing Architecture[6].

37.1.1. Cloud Deployment Models:

The cloud computing model describes the nature and purpose of the cloud and includes three deployment models that may be used to depict cloud service models. Fig. 2 depicts the deployment models, which are categorized as follows:

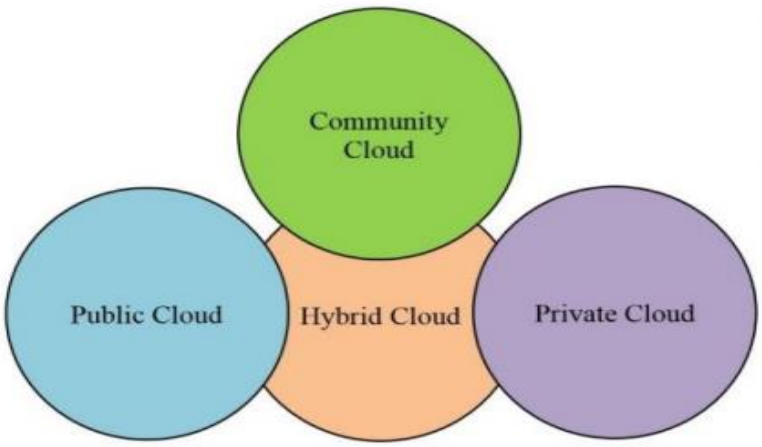

Fig. 2: Illustrates the different Cloud Deployment Models[7]

- **Public Cloud:**

A public cloud is a cloud that is hosted and controlled by a service provider, with a service level agreement between the customer and the resource provider. Cloud service providers include Microsoft, Google, Amazon, VMware, IBM, Sun, and Rackspace. The platform is built in the style of universal computing, and it can handle any kind of client demand. The materials are readily accessible and made available to the general audience. Multiple organizations are engaged in the operation of public clouds, and the resources are open to the public, making them challenging to defend against malicious assaults. Because it is outside the firewall, it raises certain issues about consumer privacy, data access, and security. It's less secure than the other deployment options, but it's ideal for small and medium businesses who don't need to set up servers or invest in money.

- **Private Cloud:**

A single company manages and maintains the cloud infrastructure, which serves numerous clients. If a company created their own private cloud and recently created their own servers with real hardware servers and a virtualization layer on top of them, resources would be accessible exclusively internally. So, instead of using Microsoft or Amazon servers, their program may be deployed to their own physical control server. They are going to build their own infrastructure. Because of its unique internal exposure, it can guarantee physical security and is more secure than the public cloud. The authorized stakeholder and organization get exclusive access to the private cloud. However, the cost is considerably greater since the server administrator, virtualization specialist, and network specialist all need skill and training. The cloud service provider's virtual application and scalable resources are pooled together and made accessible to clients to use and share. Because the infrastructure is managed and owned by the same company, it is simpler to handle the connection between the service provider and the client in the private cloud. It makes use of cloud management software's capabilities to guarantee a dependable delivery service and the integrity of external resources.

- **Hybrid Cloud:**

The term "hybrid cloud" refers to a cloud deployment model that combines two or more cloud deployment types, which may be public, private, or community clouds, while remaining distinct entities. The value of hybrid cloud is that it can provide more resources when a customer's demand is strong, and it can also be used to transfer certain computing tasks from private to public cloud. Because it provides more secure management of the apps and data, it is properly structured and allows various organizations to access data via the internet. It has advantages over other deployment options and may be hosted both inside and outside. Hybrid cloud is gaining traction and has established itself as a dominating paradigm. The primary reason is that it may benefit from the cost savings, scalability, and elasticity that public cloud can offer, as well as control flexibility when required.

- **Community Cloud:**

The term "community cloud" refers to an organization's cloud infrastructure being shared among customers with comparable interests or concerns, such as policy, security needs, purpose, and compliance considerations. We claim that the resources of the community cloud are operated, managed, shared, and handled by multiple organizations or a third party. Third-party IT services and solutions, such as those provided by Siemens, may be used to build up a media cloud for the media business. It is more uncommon and specialized. The community cloud infrastructure is shared and controlled by a variety of organizations, including research groups, businesses, and government agencies.

37.1.2. Cloud Service Models:

Cloud computing architecture consists of a collection of services that allow users to access customizable computing resources (applications, storage, servers, networks, and services) on demand, while also being dynamically scalable, virtualized, and multi-tenant[8]. It offers customers the flexibility they need to deal with quickly changing consumer needs while still providing a dependable solution. Many service providers (including Microsoft, Google, Amazon, Rackspace, and others) provide services for any of these models, including IaaS, PaaS, and SaaS. The categorization of cloud service models is critical for determining which service model meets and accomplishes each function. The service model is shown in Fig. 3.

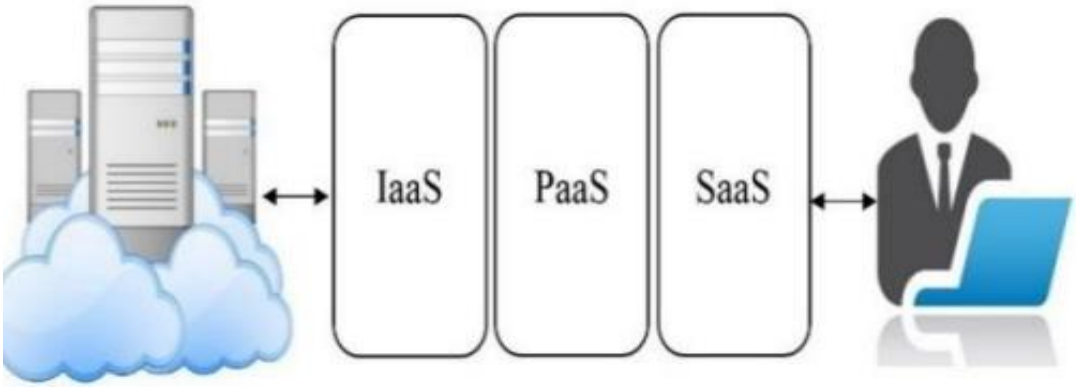

Fig. 3: Illustrates the Cloud Service Models

37.1.3. **Cloud Security***:*

Cloud security is a collection of control-based rules, compliance, and technologies that are used to secure cloud-based applications, data, and infrastructure. As more companies utilize the cloud for operational data, it has become increasingly important to contract for appropriate security and potentially susceptible regions. When it comes to shared resources, access control, privacy, and identity management, cloud computing security is a significant issue. The following are some of the issues raised:

- Data stored in the cloud may be improperly changed or deleted (unintentionally lost) by the service provider.
- Cloud providers, workers, and contractors may purposefully expose data stored in the cloud.
- In the cloud, resources are usually shared among many tenants, each of whom may be attacked.
- Data on the public network may be accessible through unsecured APIs and protocols.

However, when data is transferred to the cloud, data security becomes a challenge. The following are some of the security issues discussed in this section:

- **Cloud Storage Security:**

The popularity and acceptance of cloud storage is growing, posing a slew of security issues for both cloud providers and consumers. When utilizing file-sharing apps and cloud storage, IT professionals caution that all technologies, whether virtual or real, come with inherent dangers. Customers that keep their data in the cloud no longer own it since it is transferred via a third party, which implies that data privacy settings are beyond the control of service providers or businesses. Customers must verify that the cloud service is of high quality and that their data is

secure. Data leakage, BYOD (Bring Your Own Data), spying, cloud credentials, and key management are all security issues with storage[9].

- **Cloud Infrastructure Security:**

Cloud computing enables a dispersed workforce and offers many advantages to consumers, but it is critical to understand how to run the cloud infrastructure, which guarantees and verifies secure service deployment, data storage, communication, and safe operation via administration. Concerns about privacy, security, and dependability have surfaced as possible roadblocks with the increasing use of cloud services. At the application, host, and network levels, information security experts often establish the security guideline, rules, and practice of the organization's cloud architecture.

- **Software Security:**

Throughout their whole life cycle, the cloud provider needed to secure their apps or software from internal and external threads, from design to production. Instead of adding additional risk and posing difficulties for customers and cloud providers, it is critical to establish the security process and rules for the software that allows the company. Bugs, design faults, buffer overflow, and error handling agreements may all be used to help or hurt software security.

- **Cloud Network Security:**

It is the duty of a cloud service provider to allow only legitimate network communication and to prevent any harmful activity. The internal network infrastructure used by cloud providers to link cloud VMs to the provider network, such as access routers and switches, is not shared[10]. Internal network assaults, such as data leakage, illegal alteration, and denial of service or availability, are of concern to the client. Because the attacker may lawfully authorize from another section of the network, network security concerns both internal and external assaults. Attacks may occur on either a real or virtual network.

37.1.4. Security Challenges in Cloud Computing:

Cloud computing apps use the internet or an internal network to operate in cloud computing infrastructures. Customers verify the company's capabilities that it delivers the necessary services reliably and correctly, which is the notion of confidence in the organization. Trust in the cloud computing environment is dependent on the cloud deployment models chosen, in which applications are delegated and outsourced to the owner's management. In the conventional architecture, trust necessitated an efficient and effective security strategy that handled the functional limitations and flows between them. External systems get access to the restrictions that attack the programs that govern or provide access to consumer data. The community or public clouds assigned control to the entity that controlled the cloud infrastructure in cloud deployment models. The following are some of the security issues that cloud computing infrastructure may face:

- Integrity
- Confidentiality
- Availability
- Trusted Third Party (TTP)

37.1.5. Analysis:

This section covers the proposed security solution for the difficulties encountered in the adoption of cloud computing environments that encourage consumers to release security burdens by relying on a third party. Many cloud providers and consumers have expressed worries about

trust, security, and privacy, according to this research. The use of security methods in the cloud to ensure the integrity, confidentiality, and availability of data or systems, as well as to alter the relationship between the cloud provider and clients. To prevent unwanted access to shared resources, a reliable access control architecture is required. To enable safe communication, trust must operate at each tier of the cloud service models (IaaS, SaaS, PaaS), and it must guarantee security at the technological, legal, procedural, and operational levels. A trust certificate acts as electronic authentication and establishes an entity's credentials, identity, and obligations. TTP provides the necessary trust by ensuring the identification of communication parties or organizations and checking for compliance with stringent rules and criteria. The end user must use an electronic certificate to authenticate with the cloud service and to validate the access permissions to use the specific resources. Because the cloud architecture assures or protects the security of encrypting exchange data by combining the personal digital certificate with the service provider certificate (IaaS or PaaS), the secure SSL connection is established.

38. CONCLUSION

Cloud computing is a new technology that offers many advantages to consumers, organizations, and businesses. However, despite its many benefits, cloud adoption poses a number of security concerns. We went through cloud computing architecture in depth, including deployment methods, service models, cloud components, and cloud security. This study aimed to demonstrate a variety of security problems, threats, assaults, and vulnerabilities in systems or data during cloud transfer. The security threat countermeasures will aid businesses in continuing their cost-benefit analysis and encouraging them to migrate to the cloud. We addressed the general architectural concepts of cloud computing environments in this article, which arise from the need to keep track of important threads and vulnerabilities. Cloud computing security necessitates a basic point of view based on reducing security and trust to the TTP. The majority of the highlighted risks may be addressed with cloud computing using a mix of SSO, LDAP, and PKI to deal with the authenticity, availability, integrity, and secrecy of communication or data. This study may be expanded upon in the future to enhance the quality and availability of services, which will entice consumers to cloud computing deployments and increase customer confidence in TTP. In addition, cloud computing services that meet security needs include creating a framework for a comprehensive security and privacy trust assessment management system.

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TRENDS IN CENTRAL ASIA: HEALTH RISKS FROM LARGE-SCALE WATER POLLUTION

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ABSTRACT

At basin sizes, health-risk evaluations are hampered by a lack of data on the pollution state of geographically vast water systems. We show that agricultural and industrial pollutants in groundwater–surface water systems of the Aral Sea Drainage Basin (covering the main part of Central Asia) produce cumulative health hazards above guideline values in downstream surface waters, due to high concentrations of copper, arsenic, nitrite, and to a lesser extent dichlorod in downstream surface waters, using a recipient measurement approach in a terminal water body (DDT). We also conduct trend studies of these high-impact pollutants' upstream spatial–temporal distribution, examining prominent large-scale spreading processes. The ratio of parent DDT to its breakdown products indicated that discharges or depositions into surface waters were likely recent or continuing. Copper concentrations in river water rise in the spring following thawing and snow melt. The high geographical variability of arsenic contents in river water may be due to its presence in adjacent agricultural areas' top soil. Groundwater's were shown to be linked with much greater health hazards than surface waters. If the downstream population is forced to convert to groundwater-based drinking water sources due to a lack of surface water, health concerns may skyrocket. Due to continuing irrigation development and climate change, arid areas are particularly susceptible to this issue.

KEYWORDS:*Aral Sea, Groundwater, Health Risk, Irrigation, Pollution, Surface Water.*

1. INTRODUCTION

Contaminants may be transported and spread from spatially restricted industrial or mining sites to large downstream regions via groundwater and surface waters, which are important parts of the continental water cycle. This is on top of the spread of more dispersed pollution, such as pesticides sprayed over agricultural areas. Man-made pollution has degraded the world's water resources to the point that they can no longer be restored to their original state. Health-risk evaluations and ecological impact assessments are useful tools for determining tolerable pollution levels and remediation target levels. For site-specific customization of successful remediation techniques, it's also necessary to consider how downstream pollution levels may vary in response to various feasible upstream remediation strategies, such as source removal,

land use changes, and various water treatments[1]. In addition, climate and other changes in the environment may have an impact on pollutant dispersal. As a result, remediation evaluations must be based on a scientific knowledge of large-scale dynamic flow and transport mechanisms. The lack of clear field datasets and syntheses of large-scale contaminant spreading that can be used for independent testing of various predictive models has hampered current scientific understanding. Observed changes must be significant enough to distinguish themselves from random variations induced by weather and geological variability, .The deepening environmental, health, and socioeconomic crisis in Central Asia (traditionally defined as the former Soviet Union states of Uzbekistan, Turkmenistan, Tajikistan, and Kyrgyzstan), which coincides to a large extent with the extensive Aral Sea Drainage Basin (ASDB), provides an example of severe human-induced changes in the continental cycling of water and dissolved substances . The problem is mostly due to the overexploitation of water resources in the lower desert area of ASDB during the Soviet period, which was exacerbated by massive irrigation projects. Overexploitation has resulted in a significant reduction in river flow into the Aral Sea, causing its desiccation. Groundwater flows have not dropped as much as surface water flows in recent years, and they have therefore become more significant Organochlorine pesticides and hazardous metals, including arsenic, have been found at high quantities in the ASDB's population's blood, milk, hair, and urine). Compared to 1960, before the ecological decline, maternal and infant mortality, child growth and puberty delays, liver and digestive system disorders, allergic problems, and diseases related to bacteriological status of water and soils have all increased significantly in this region Muntean et al. discovered that locally produced animal foodstuffs offer a significant exposure route for persistent organic pollutants in Karakalpakstan, Uzbekistan. Furthermore, in the lower ASDB, drinking untreated local water is widespread. Only 20 to 30 percent of the rural population in Karakalpakstan, for example, has access to piped water, while 25% of the population gets its water from irrigation canals[2]. It's possible that pollution exposure via drinking water contributes significantly to major health issues. Nitrogen compounds, copper, lead, chromium, and uranium, for example, have been reported to exceed World Health Organization (WHO) drinking water regulations in groundwaters and surface waters of the drainage basin We look at the health risks associated with the water-borne, basin-scale spread of a variety of persistent pollutants, such as pesticides and hazardous metals. The geographical coverage of surface water and groundwater monitoring sites becomes restricted when such vast scales are taken into account. Not to mention that comprehensive measurements of the groundwater system are difficult to come by. This problem is solved by interpreting new measurements in the downstream reservoir, which has effectively replaced the Aral Sea as a terminal water body and main recipient of pollutants from the ASDB's major groundwater–surface water systems due to severe water scarcity over the last decade. We identify the most dangerous pollutants from this hydrological focal point (in terms of human health) and synthesize data on their distribution in upstream water systems of the ASDB's biggest sub-basin, the Amu Darya drainage basin. We look at disparities between various hydrological systems (river water, reservoir water, and groundwater) as well as geographical and temporal patterns along hydrological routes. The research aims to uncover large-scale impacts of physical and chemical mechanisms that control the spread of persistent hazardous pollutants. Figure 1 shows The Aral Sea drainage basin (black solid line) with the Amu Darya river delta (dotted line) south of the sea, in which Mejdurechye Reservoir is located. Location of sampling sites for surface water and groundwater, main irrigated areas[3].

Figure 1: Shows The Aral Sea Drainage Basin (Black Solid Line) With The Amu Darya River Delta (Dotted Line) South Of The Sea, In Which Mejdurechye Reservoir Is Located. Location Of Sampling Sites For Surface Water And Groundwater, Main Irrigated Areas.

2. DISCUSSION:

2.1. Application:

The HFs for nitrate and nitrite in river water were below one and did not suggest a health concern, while the HF for nitrite in Nukus drainage water was close to three, indicating a health risk. In addition, the Mejdurechye reservoir water has considerably higher nitrite HFs (near to 4; Fig. 3a, right side) than the Amu Darya's upstream river waters. In the lower Amu Darya drainage basin's tested river and reservoir waters, the HFs for fluoride, arsenic, mercury, and copper were all less than one. Fluoride (HF= 0.4) and copper (HF= 0.2) in the Mejdurechye reservoir water had the highest HFs in the river-reservoir system. The arsenic HF in the Mejdurechye reservoir was likewise somewhat higher than in upstream river waters. Copper is the only one of the four chemicals listed in that has allegedly been measured in groundwater. Copper HFs in groundwater are two orders of magnitude greater than in river water and one order of magnitude higher than in reservoir water, according to the findings .When compared to the standard deviation values in [4], the temporal and geographical fluctuations of copper HFs in the river water of the Amu Darya delta are considerably lower, indicating that there is a systematic difference between copper HFs in groundwater and river water. The copper HFs in groundwater rise along the groundwater flow direction from Chalish to Dusenbay. Chromium, lead, manganese, and nickel concentrations in THC reservoir waters and upstream river water at Darganata are hazardously high, (left side), with HFs ranging from 1 to 5. If the higher US EPA guideline value is applied, HFs for chromium in reservoir waters are lower than 1. The choice of reference concentration levels for this chemical is the sole factor that influences whether the HF value surpasses 1. In particular, HFs for chromium (up to 280) and lead (up to 65) in groundwater samples from Chalish, Yangibazar, Dusenbay, and Buzkala[5]. The mean HFs for chromium and lead at river measuring sites between the THC and the Mejdurechye reservoir are approximately four orders of magnitude higher than these groundwater values. Furthermore, while we plot results from only four of the 14 groundwater sampling locations of Froebrich et al. in illustration purposes, the other ten sampling locations (in the Amu Darya delta within 45 km of the Amu Darya River) had similarly high groundwater HFs for chromium and lead (intervals of 120–280 and 20–70, respectively) [6].The four recent (2007–2008) monitoring sessions in the Amu Darya river basin's final surface water receiver of water-borne pollution, the Mejdurechye reservoir, revealed that cadmium and nitrite concentrations sometimes surpassed WHO's health-risk based guideline levels (Table S1). Copper, fluoride, -HCH, and arsenic concentrations were

slightly below their respective guideline levels, whereas nitrate, mercury, lead, and chromium concentrations were much lower. DDT and its degradation products were also detected for the first time since at least 2002 during the 2007–2008 campaigns. In the two 2007 campaigns, the CHF for the Mejdurechye reservoir, which expresses the cumulative harmful effects of the tested chemicals, was about 1, 0.03 in May 2008, and 9 in July 2008. On various measurement occasions, different combinations of chemicals contributed to high CHFs (i.e., CHF1): in July 2007, copper, fluoride, and arsenic dominated, while in October 2007, nitrite, fluoride, and copper dominated, and in July 2008, cadmium and nitrite dominated (see further Table S1 in Supplementary information for detailed Mejdurechye measurement results). When calculating CHFs, the WHO long-term exposure reference concentration for nitrite was utilized.Monthly measurement data from the stations Termez (Te), Tuyamuyn (Tu), Nukus (Nu), and Kziljar (Kz) located along an extensive upstream stretch of the Amu Darya river were available for four of the top five substances contributing to the Mejdurechye CHFs in 2007 and 2008 (arsenic, copper, fluoride, and nitrite).illustrates the proportion of substantially difference ensemble mean HF values across groups when categorizing data by location, year , and season of measurement for these four high HF drugs. In four of these six instances, the difference in mean arsenic HFs between sites Te–Tu, Te–Nu, Te–Kz, Tu–Nu, Tu–Kz, and Nu–Kz was determined to be statistically significant. Te–Tu and Nu–Kz were the only two location pairings that did not have significantly different mean values. The underlying ensemble mean HFs and standard deviation values for Te, Tu, Nu, and Kz help to explain this finding. The picture depicts a significant range overlap (mean one standard deviation) between the upstream Te and Tu stations, as well as the downstream Nu and Kz stations, as well as a lack of overlap between all other potential station combinations, yielding the statistical result. As a result, there is a noticeable difference in mean arsenic HFs upstream and downstream. The spatial variation of nitrite HFs is also significant. also indicates that arsenic and nitrite HFs have large geographical variability when compared to yearly and seasonal changes[7].

2.2. Advantage:

The ASDB is a 1,874,000-square-kilometer endorheic basin that includes two major rivers that flow into the Aral Sea: the 2400-kilometer-long Amu Darya River and the 2500-kilometer-long Syr Darya River. The Amu Darya River flow accounts for a significant portion (about 70%) of the ASDB's renewable water resources. The primary source of river discharge is meltwater from the Pamir Mountains' snow and glaciers, which produces flow maxima between April and September. Before the irrigation system's large-scale development, the average Amu Darya discharge was 78 km3 per year1. Because the Amu Darya River basin comprises the majority of the ASDB's irrigated lands, river discharge currently fluctuates between 0 and 1 km3 year1.Toxic chemicals have been dispersed over agricultural areas, including Fig. 1, as a result of widespread usage of fertilizers, insecticides, and herbicides. Mejdurechye Reservoir is situated in the Aral Sea drainage basin (black solid line) with the Amu Darya River delta (dotted line) south of the sea. The location of surface water and groundwater sample locations, major irrigated regions (outlined in grey; Global Map of Irrigation Areas, Siebert et al., 2005), and the Aral Sea extent in 2005 (filled blue) and 1960 are shown. (The reader is directed to the online version of this article for interpretation of the color references in this figure legend) DDT, -hexachlorocyclohexane (-HCH), arsenic, and copper are all examples of chlorodiphenyltrichloroethane (DDT). Surplus irrigation water evaporates or returns to rivers, resulting in a build-up of agrochemicals and salt in the rivers downstream. Furthermore, substantial mineral reserves were discovered inside the ASDB during the Soviet period. Cadmium, copper, lead, and uranium, for example, are metals obtained from Uzbekistan's current mining sector (Clark and Naito, 1998)[8]. Acid mine drainage, which often includes high metal concentrations, particularly increased arsenic concentrations, is a major pollution source in

ASDB as a result of the well-developed mining sector Because of its physical position further downstream in the basin, the Amu Darya river delta receives water-borne pollution fluxes from the major portion of ASDB. The delta is located in a semi-arid climate. Summer temperatures vary from 45°C to 30°C, while winter temperatures range from 30°C to 45°C. Annual precipitation averages 133 millimetres, and potential evaporation ranges from 1200 to 1600 mm. As a result, it is completely reliant on runoff from upstream regions flowing via rivers and canals. It therefore has features similar to the Nile delta in Egypt and the Eufrat–Tigris marshes in Iraq in terms of water balance and vulnerability. The Amu Darya delta and related irrigation canal networks encompass almost twice the size of the Nile delta, with a total area of 40,000 km2. Since approximately a decade, the Amu Darya River has run dry before ever reaching the Aral Sea's old coastline. The Mejdurechye reservoir, with an area of approximately 180 km2 and a maximum depth of 4 m (for a more comprehensive description, see the Supplementary material), is one of the biggest water bodies in the delta and has effectively become a new delta terminal water body[9].

2.3. Working:

We calculate health hazards using hazard factors (HFs), which are calculated by dividing observed concentration levels by a reference concentration, with HFs greater than 1 indicating possible health concerns. The reference concentration is a substance-specific concentration below which there is a very minimal probability of harmful health consequences if a lifetime consumption of water at the reference concentration is consumed The HF quantifications presented here are based on WHO drinking water guideline levels. Due to quantification uncertainties and different assumptions regarding, for example, body weight (WHO assumes 60 kg and U.S. EPA assumes 70 kg) and relative source contribution for substances that are primarily likely to come from food, the US Environmental Protection Agency's (US EPA, 2006) guideline values may differ from WHO values (WHO assumes 10 percent and U.S. EPA assumes 20 percent). The two standards vary by a factor of two or more for chromium, fluoride, mercury, and -HCH. The effect of the HF discrepancies on interpretations and findings is then reported. The addition of substance-specific HFs to a mixture may be used to quantify the health risks of multiple co-existing dissolved pollutants. In the absence of more specific data on interactions between the components of the investigated combination, this gives a cumulative hazard factor (CHF=HF), which, with its presumed additive toxic effects, offers a meaningful first-order estimate of aggregated toxicity. CHFs were computed for the combination of chemicals detected during each of the four sample sessions conducted in the Mejdurechye reservoir in 2007 and 2008. The period between the Soviet Union's DDT prohibition and the measurement campaigns in 2007–2008 is longer than DDT's half-life in soil. If variations in transport characteristics between DDT, DDD, and DDE were ignored (e.g., assuming equal retardation), sources of old DDT from before the ban would produce rD b1 in water that is much lower than observed. As a consequence, assuming this simplifying assumption is correct, the observed DDT cannot be due to subsurface movement of ancient DDT. The simplifying assumption can be relaxed by taking into account differences in retardation between DDT and its degradation products, with the partition coefficient Kd for DDT (log Kd= 4.8) being higher than for DDE (log Kd= 2.7) and DDD (log Kd= 2.9) (Walters and Aitken, 2001), implying higher retardation and slower transport of DDT than for DDE and DDD.These retardation differences, in comparison to the equal retardation case, may contribute to decreases in rD at downstream observation points, because low DDT concentrations would persist for longer due to its higher retardation. Whereas \sa) \sb) \sc)Mean HFs for nitrite and nitrate in drainage and river water, b) fluoride, arsenic, mercury, and copper in groundwater, reservoir, and river water, and c) cadmium, chromium, manganese, nickel, and lead in groundwater, reservoir, and river water. The locations of the reservoir water samples are highlighted. Samples with concentrations below

the detection limits (DL) and thus low HFs are indicated by values below the horizontal solid lines. The locations are categorized from left to right in the figure based on upstream to downstream mean surface waters and groundwater flows. Abbreviations: THC stands for Tuyamuyn Hydrological Complex Reservoir, while Mejdu stands for Mejdurechye Reservoir. While this logic is valid in many instances, there are certain outliers in which variations in retardation may lead to increases in rD. However, such events (which can mask the true age of old spills by making them appear more recent) are limited in space and/or time; for more information, see the Supplementary information. The Mejdurechye reservoir, in particular, receives pollutants from large upstream areas and has been monitored for a long time. Overall; it seems that ancient DDT is unlikely to account for the elevated rD observed in the Mejdurechye reservoir. Another possible reason is that the DDT leak was just recently discovered. DDT has a short half-life in surface water, so it couldn't have been in contact with it for very long before being detected in the Mejdurechye reservoir. This narrows the range of possible DDT sources to illegally stored stockpiles, recent storage site leakage, and atmospheric deposition. Similarly high rD-values have been found in South China's Pearl River Delta waters, suggesting continued DDT usage after China's 1983 prohibition. Copper pollution is mostly found at the ground surface or in the near-surface environment, according to the ASDB. Copper mining tailings and agricultural areas, where fertilizers (such as copper sulphate) and insecticides are utilized, are two potential sources. Copper HFs peak in the Amu Darya's most downstream river gauging station (the Kziljar station; near to the Mejdurechye reservoir entrance) during the spring, when precipitation is high. The statistically significant connection between season and copper content is mainly due to increased copper concentrations in March. Copper may build in higher soil layers during dry periods and then mobilize during early high-precipitation events of the growing season as a consequence of leaching and/or soil erosion, according to one possible explanation. For example, Zhang et al. suggested this process as a possible explanation for dissolved copper peaks in drainage water from agricultural areas in St. Lucie County, Florida. It may also explain certain findings made by Bordalo et al. in Thailand's Bangpakong River. Lower winter temperatures (below 0 °C), more extensive irrigation, and an arid environment with precipitation events mostly confined to winter and early spring set the lower Amu Darya region apart from the research regions of Zhang et al. and Bordalo et al. The current findings indicate that copper concentrations peak after thawing and snow melt, and then decrease throughout the summer season, despite significant water re-routing to irrigate areas. The lower Amu Darya river's nitrite concentrations were similarly greater in the spring than in the summer; co variations between copper and nitrogen compounds also occur under various environmental circumstances, as documented by Zhang et al. and Bordalo et al. Natural arsenic has little effect on surface water systems unless there are geothermal sources. Our findings indicate that in the presence of human-made arsenic sources (from agriculture and potentially mining), arsenic may leach into surface waters to the point where it contributes significantly to CHFs in drinking water. Previous studies on arsenic leaching from cotton fields have also shown that vertical arsenic migration is very limited even under irrigation, so leaching into surface water systems is likely to be the main transport pathway for anthropogenic arsenic (as opposed to natural arsenic). Smedley and Kinniburgh found geographically restricted arsenic contamination in surface waters near recognized superficial sources, which is consistent with the significant spatial variability of arsenic contents in river water along the Amu Darya (mining tailings). As a result, high arsenic levels in downstream ASDB river water stations may indicate its presence in adjacent agricultural areas' top soil[10].

3. CONCLUSION:

The cumulative health hazard factor (CHF) of the examined pollutants ranges from negligible to roughly 10 depending on the time and place of drinking water consumption. Copper, lead,

nickel, manganese, and chromium contents in the Amu Darya delta were found to be higher than WHO drinking water guideline levels. Although average cadmium readings were below the recommended limit, specific testing occasions surpassed it. The recognized negative health consequences of an excessive consumption of these pollutants. As a result, it's fair to believe that poor drinking water quality has had a role in the situation. Because low-risk surface waters still persist (at least temporarily) in certain parts of the Amu Darya delta, it's possible that water control schedules may be tweaked to improve water quality in terms of aggregated toxicity at key drinking water intake sites. The Amu Darya delta's groundwater in formations that (from a hydrogeological standpoint) can support larger-scale drinking water supply contain substance concentrations that are orders of magnitude higher than WHO drinking water guideline values, in contrast to relatively low-risk surface water systems. This means that consuming water derived from groundwater poses significant health hazards, much more than those posed by surface water. Furthermore, as a result of a surface water scarcity that has already resulted in the desiccation of the Aral Sea, demands on switching from surface water-based drinking water supplies to groundwater-based supplies are strong in the Amu Darya delta. Current findings indicate that switching water supply systems (from surface water to groundwater) may result in a significant worsening of health hazards, in addition to potentially lowering groundwater levels owing to inadequate recharge. Due to continuing irrigation development in the upstream portion of the Amu Darya drainage basin and ongoing climate changes, the surface water scarcity is projected to worsen in the near future. Similarly, in many arid areas of the world, polluted groundwater may become the only remaining water source, as surface water discharges are expected to decrease globally in response to projected global irrigation increases and projected climatic changes.

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REVIEWS PAPER ON MENTAL ILLNESS STIGMA

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ABSTRACT

People who suffer from serious mental illness often find it difficult to continue, and dropout rates are high. A client's perception that the therapy would fulfil his or her own particular objectives, the therapeutic relationship, and the accessibility of care are all variables that may affect treatment participation. As a result, we have found that recovery-led care is a helpful tool for examining techniques and approaches that encourage engagement with the person receiving support, with independence, empowerment, and respect as top priorities. Person controlling is a treatment approach that focuses on the individual's unique goals and circumstances, including shared decision-making. The use of personal care in mental health treatment models has shown to be effective. Historically, some groups of individuals, such as young adults experiencing their first episode of psychosis, those with complicated psychiatric and drug use issues, and homeless people, have been difficult to engage with. This research emphasizes these stigmatizations and shows how different evidence-based treatment methods have improved their outcomes. The emphasis of this research is focused on therapeutic approaches that may improve involvement. Therapy is complex and varied; nevertheless, providing services to individuals with serious mental illnesses necessitates the development of optimum recovery-oriented skills and attitudes.

KEYWORDS: *Health, Mental Illness, Social, Stigma, Treatment.*

1. INTRODUCTION

Mental illness, sometimes referred to as mental health problems, refers to a variety of illnesses of psychological health that impact your mood, thought and conducts. For insance, depression, anxious disorders, schizophrenia, food problems and addictive behaviour. Many people occasionally experience mental health issues. However, a mental health problem is becoming a mental disease whenever continuous indications as well as sensations often create stress and influence your functioning. Mental illness can miserably lead to issues, such as at school or job, in your daily life[1]. In many situations, medication and speech treatment can also be used to control symptoms (psychotherapy).

Mental stigma is when someone looks down on you because of a certain feature or quality (such as cultural background, a mental illness). It is discrimination if someone treats you in a bad way due to your mental condition. Stigma occurs when a person defines someone by his disease and

not as a person. For example, they may be labelled 'psychotic' instead of 'psychotic.'Social stigma and prejudice can exacerbate their problems for persons with mental health concerns and make it more difficult to rehabilitate.

This might drive the individual to resist receiving treatment because of fear of stigma.Persons with severe mental illness typically have difficulty continuing therapy and a stopping therapy is all too prevalent. Because various variables help to preserve someone's commitment to therapy and readiness to quit, it is a difficult to identify important components for improving engagement.

Disengagement may be connected to problems of utility, attitudes (people feel that therapy does not work), distrust, or practical reasons or problems (treatment may be difficult to get to, difficult to schedule).There is no one method, because involvement is taking place in the context of a unique personality, social as well as living conditions of an individual and the weight of symptoms. Approaches that address any and almost all of the alleged barriers can be utilised to increase treatment engagement most effectively. In this study, we highlight some practical and conceptual advances in the treatment of mental health that have demonstrated an increased commitment to mental health care.

In a specific social setting, stigmatised persons have (or are thought to possess) some characterization or quality which transmits a societal identity. Simply said, stigma is a negative manner of judgement which develops on a societal level and which is not particular to a person linked with some features and conditions. When society accepts a certain, generally unfavourable, image with subtle features, it is called a stereotype in a given set of people. The stigma is a complicated political and socially influential phenomenon.

1.1 Prevalence of Mental Illness Related Stigma:

Mentally ill people are, according to the World Health Organization, frequently exposed to violations of human rights, stigma and discrimination. Several researchers have found a link between drug use, prostitution, and criminality between common conceptions of mental health. Other research has indicated that there is a less unfortunate public response to mental illnesses, with a significant percentage of those disabled. This may affect the right of people with mental illness to secure living, medical care and employment.

It is not simply stigma and unfavourable convictions that affect the public.Healthcare professionals show some undesirable mental health attitudes. In many areas of healthcare, stigma and discrimination may be found. Psychiatric disease might get less funding, lower standards and a broadly based harmful society.Pre-based stereotypic ideas, discriminatory behaviours and negative attitudes when transferring to healthcare might influence patient interaction. Patients have been said to devalued, rejected, and dehumanised by many health workers.

Healthcare professionals cannot unconsciously express unfavourable sentiments about people with mental health problems. Except for decision making, lack of severe symptoms, lack of physical and mental know-how and paternalistic or condescending behaviour[2]. A survey of Turkish physical therapists using ideas on mental illness indicated that Turkish physiotherapy students had moderate positive attitudes. Students experiencing mental illness relations or psychiatrists as well as psychotherapists were better in grades.

1.2 Impact of Stigma on People with Mental Illness

Mentally ill persons confront both the difficulty of the condition and the stereotype and criticism. Public stigma is not just a kind of stigma, but also a kind of stigma. Public stigma is also involved. Self-stigma is a barrier to personal growth and can challenge the achievement of a positive position in personal and professional life. Between stigmatised persons there were

higher cortisol levels and depression[3]. Those who stigmatise are disgusted. Stigma has a different dimension in healthcare. Because mental health is linked to less productive views, professionals in medicine cannot seek assistance and fear their colleagues' judgements with an elevated suicide risk when needed. In a different way, some authors have found that stigma has a positive influence on mentally ill persons. While some people may experience a danger, others may be energetic and more driven in therapy.

Techniques and instruments for enhancing involvement in the rehabilitation-oriented care framework are beneficial for viewing. This recovery reflects a change of mind set and of professional approach that has developed over the last several decades, with a report from the proposing recovery-oriented, consumer- and family-driven mental healthcare[4]. The promotion of citizenship, organisational commitment, supporting personal objectives and a good working relationship5 are four elements of recovery-led practise. Four dimensions include the following techniques are all potential strategies for care providers to improve their participation in people with significant mental illness if they adopt a recovery-oriented position.The stated priority of autonomy, empowerment and respecting the individual receiving treatment are a very significant characteristic of recovery-oriented care. This study thus describes variables that might improve the experience as well as hope of recuperation of a client.

1.3 Stigma Around Mental Illness

Organizational discrimination has also been highlighted as a significant problem for mental health. Stigmatizing views can prevent people with a mental condition from seeking assistance, prevent them from successfully reintegrating themselves into society and enhance their psychological problems. Several stigma studies have focused on the overall stigmatisation of ideas and behaviours. However, stigma towards psychiatric consumers is not an unusual issue among professionals[5]. Professionals typically tend to reflect the public's negative sentiments about more explicit elements of the stigmatisation process.

These are the fundamental aspects of social stigma, such as stereotyping and social remoteness because preventing damage to, upsetting, and disrupting human lives. It is vital to include mental health professionals as a major target group in anti-stigma initiatives since their attitudes are not that different from unfavourable general views of mental illness.Professional mental health specialists are specially trained in the treatment of mental illness and obviously more in contact.

As a group, it would be reasonable for them to think that in relation to the laity, nonmedical professionals and / or medical students, their views towards people with mental diseases have been less stigmatising. This does not seem to be the case, however and the stereotypes of the public are reflective, as indicated above. Knowledge of the disease and ongoing interaction therefore appears not to be sufficient to address the stigmatic issue.

A number of solutions have been offered to address the question of stigmatisation by experts in mental health.These include the improvement of vocational training, quality assurance and prevention of burnouts through regular monitoring. Neither has been tested in particular so yet, though. Moreover, there is an insufficient awareness of the fundamental components of training which should assist to reduce these stigmatic views.This research examines whether it would be helpful in decreasing stigma among professionals in mental health for the mentally ill, focusing on the fundamental questions of stigma and discrimination (e.g., psychoanalystsas well as psychiatric inhabitants).

1.4 Attitudes And Interpersonal Focus:

1.4.1 The Therapeutic Alliance:

The therapeutic alliance is a description of the connection between physiotherapists and their patients, sometimes called the working alliance. The therapeutic relationship can also have an influence on treatment results as an important element of the therapeutic process.The therapist then attempts to give a patient-centred treatment by creating a therapeutic alliance whereby the therapist is regarded as a helper for the patient's aims rather than an entity[2].The significance not just of delivering patient-centred treatment, but also of other medical occupations, in physiotherapy. The aim is to encourage the patient to become more involved in their therapy in a collaborative and active recovery approach.

The therapists are able to strive to treat the psychological components of pain, frequently ignored in typical unidirectional patient-therapist encounters, by building a strong therapeutic relationship and promoting patient engagement. This is especially essential, as current study has shown that the improvement of patient results cannot be fully taken into account in physical treatment alone.The clinician's recovery guidance, lower reported self-stigmatism, and higher degrees of insight included schizophrenia and schizoaffective illness, independent therapeutic alliance predictions. Interestingly, the quality of alliancewas not linked to the severity of clinical symptoms, the type of attachment, age and length of the therapy. Recovery-oriented efforts from a physician might improve the relationship.

1.4.2 Person-Cantered Care:

The concept of person-cantered care is becoming increasingly common in the changing health care landscape. Person-cantered care has no single, operationalized definition or standard of measurement. In the context of mental health services, we find particularly compelling the following description of person-centric care as well as an appropriate foundation to evaluate:

It is the concerted effort to incorporate an individual’s own culture, background and immediate goals into treatmentplanning.Engagement can be strengthened via mental health therapies that include aspects that meet current needs of an individual. Housing and finance, for instance, are two possible causes of major stress that may affect the well-being of someone[6]. Addressing these obstacles as particular clinical care components might assist to increase participation.

If someone is financially safe and accommodated, he/she may have fewer specific hurdles to therapy. A more indirect, larger effect of addressing these healthcare components might be for the receiver to feel assisted and increase their trust in the system, develop alliances and serve as the basis for future treatment efforts.The same decision-making process may be seen as a single method to caring for people. Comparative decision-making is a joint, dynamic interactive process between two equally involved participants, in contrast to more authoritative healthcare delivery patterns.

In this paradigm, both the physician and the patient participate in an information exchange that leads to an agreed treatment decision[7]. This approach to therapeutic care has been apparent during the past decade, albeit many of the research investigating its effectiveness have been conducted in non-psychiatric groups.While several studies have shown that common strategic planning for people suffering from severe mental illnesses is helpful, caregivers may fear that the ability of patients to make a choice is hindered and may hence be less inclined to employ shared decision-making in this group[8].

Because the participants' impression because their objectives, wishes as well as circumstances are taken into account is one recurrent theme emerging from effective engagement analysis, it is reasonable that a much more shared decision-making approach might increase care commitment. Self-efficacy itself has also been linked to enhanced therapeutic results[9]. It may not be the actual decision point but the patient and the provider process that is the most significant result of

the shared decision-making process. An open, inquisitive as well as non-judgmental atmosphere provides confidence and improves therapy commitment optimally.

Their engagement in decision-making is to be high in both mental and no psychiatric healthcare. Understanding this, can influence decision-making improve therapy and development? There has been a definite relationship between treatment satisfaction and the degree to those, which individuals would like to participate in the decision-making process.Those who felt obliged to undergo treatment (lower-perceived justice, poorer pharmaceutical experiences) or had greater degrees of treatment dissatisfaction have said they wanted to be more involved[9]. By contrast, the desire to engage in medicinal decisions was reduced for individuals persuaded they need medicines and indicated great pleasure.

The studywith severe mental illness shows that all of those functioning earning pay, college and higher education, having diagnoses and having an inadequate therapeutic connection with such a therapist were more inclined to take part in joint decision-making. The study showed that decision-making preferences vary over time and an ongoing assessment of the position of the patient is an important part of excellent clinical treatment.

The adoption of collaborative decision making in therapeutic settings can be assisted by web-based and technological technologies. One research investigated the usefulness of integrating a computer-based tool in the waiting room of a community clinic for common decisions, in which people with severe mental illness had received treatment. Before doctor's appointments, participants utilised this tool to produce a written document detailing any decisional disagreements with the doctor[8].This helped participants to explain their personal difficulties, to enable them to discuss tough themes and to organise their thoughts. The authorhas created and are largely recognised by both patient and physician, additional web as well as computerized judgement aids.

1.4.3 Substance Use And Serious Mental Illness

Those with severe mental health are more prone to use substances than those with no such diseases, with some research that indicate that 50% to 60% of schizophrenias have a comorbid problem with substance use. It is generally recognised that it is harder for individuals who are suffering from significant mental illness and substance use than without them, and standard therapies have failed to engage this demographic effectively[10]. Drug addiction is actually one of the most important aspects in the patients with mental health, which is not initiated or engaged.This difficulty is associated with several downstream consequences, such as rehearsal often, high symptom severity, psychosocial impairment and a Tran’s agency in prisons and other non-mental-health settings.

This difficulty has several downstream implications. The fragmentation of the care system is one reason why people with double diagnoses may be less involved in therapy.In the history of drug use treatment and psychiatric thermal programmes, various financing streams, training and philosophic approaches have been completely separated. This often prevents persons who have been diagnosed with dual diagnosis getting treatment from either program.

An individual seeking the treatment of "psychiatric" symptoms was notified first and vice versa. This sequence-based treatment strategy failed to take account of the interactive and cyclical character of these diseases as well as adding yet another barrier to care. 48. Integrated dual diagnostic therapy programmes emerged in the 90sand tried to respond to the fragmented treatment of people who had been diagnosed with two diagnoses. They highlighted outreach, integrity, a long-term view and a consistent approach and attitude.

Training in motivational approaches, cooperation, social assistance and a community supporter included several such programmes. The treatment for people with double-diagnosis is now

scientific proof and studies showed that the approach enhances diverse treatment benefit, including participation in treatment, possible substance use reductions, more unstable dwellings and more reductions in psychiatric hospitalisation and arrest. Some research suggest that the dual diagnosis is improved initially and ongoing, together with integrated treatment programmes, including assertive community treatment.

The elements found for enhancing participation include shared objectives, positive views that concentrate around medicines, continuing psychoeducation, collaboration on team care, and community outreach, among numerous treatment programmes that treat sub-stance illnesses and mental health problems.

2 DISCUSSION

While this study provides an insight into an intervention in contacting knowledge to reduce the stigma of mental illness and improve adolescence mental health literacy, limitations include self-report measures, low reliability of the results variable in our own voice measurement and incontestability in the analysis for intergroup contacts. Furthermore, we did not gather information on the use of psychological services to appreciate the generality of the results of studies.

Many innovative strategies are emerging to improve treatment engagement. As demonstrated in this review, engagement strategies focus on practical methods and tools, as well as on helping to change attitudes and overall approaches to treatment of people with mental illness. In order to implement these strategies to improve engagement, mental health providers, too, must feel engaged with the work they are doing. The new approaches call for open-mindedness and flexibility about a shifting structure and delivery of mental health care.

In addition, this study might be a moderating variable.The inability to audiotape may indicate low fidelity to the implementation strategy component involving audit and feedback. Wide variation occurred in clinician participation in training and consultation, as well as consumer recruitments. However, clinicians who were more engaged in the implementation strategy were more likely to report intended future use.

3 CONCLUSION

However, presumably, all mental health providers are in this field because they are dedicated to improving the well-being and health of those who suffer from mental illness, individual and systemic barriers may prevent providers from delivering treatment that optimally enhances participant engagement. The realities of working within the current mental health system include limited resources, limited time, and increasing oversight by managed care companies. Clinicians commonly cite these concerns as reasons why they are reluctant to change treatment services or take on amore recovery-oriented approach. In tandem, there are myriad attitudinal concerns about recovery-oriented treatment, including fear of increased risk, concern that only certain types of participants can be engaged in treatment, and an assumption that recovery-oriented services devalue professional skills.

It is clear that, in order to affect global change, these concerns must be addressed. Services can be streamlined to more efficiently utilize resources, relieving some of the existing pressures that psychiatrists face, and thus allowing them more time to engage in face-to-face, meaningful

clinical interactions. Making concerted efforts to address fears, stigma, mis-conceptions and practical constraints will help to transform our mental health system to improve initial and ongoing engagement.

This review is other areas to consider as ways to enhance treatment engagement include wellness and exercise, role of families – including siblings – in treatment engagement, and use of trauma-informed care to engage individuals with traumatic pasts. Future areas of research may explore issues related to training and implementation of engagement strategies in the context of a rapidly evolving mental health care landscape.

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PROBLEMS OF CONSTRUCTION ON INSULATED FOREST AND WEAK SOILS AND THEIR SOLUTION

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ABSTRACT

The article presents the work of the building in difficult soil conditions, building precipitation, measures to change the rigidity of the building, the main structural measures preventing uneven settlement of buildings and structures. The timing of construction can also affect the process of settlement of a building if its individual parts are erected at different times. The solution to the problem in such cases is to use lighter materials for the later fragments of the building. These can be brick or wood inserts between parts of the building made of reinforced concrete slabs.

KEYWORDS: *Construction, Industrial, Subsidence, Significantly, Individual*.

INTRODUCTION

When building on subsidence loess soils, on weak water-saturated clay and saline soils, as well as in other difficult soil conditions, the subsidence and subsidence of the foundations of industrial and civil buildings turn out to be much larger than allowed for this type of structure. For difficult soil conditions in the construction of residential and industrial buildings, the average settlement value is often less than the allowable value, but the difference in settlement between adjacent columns or panels is much higher than the allowable values.In this case, you can either significantly increase the area and depth of the foundation; in some cases, replace strip and free-standing foundations with pile foundations; to carry out work on strengthening the base soils; or to strengthen the structure of the structure so that it is normally operated at high precipitation and with large differences in the draft.

The experience of using constructive measures has shown that in most cases they can significantly reduce the construction time and reduce the cost of construction and installation work.

Constructive measures can be provided for in projects of newly built structures or applied directly during construction. For example, if during the construction of a building the soils were frozen and frost heaving processes were observed, and after thawing the soils became highly compressible and low-strength, the problem arises of how to construct buildings if the first floor has already been built. You can disassemble the constructed part of the building, remove the foundation cushions, remove the soft soil, fill it with sand and start building the building again. However, in some cases, it is possible not to disassemble the structure, but to arrange monolithic reinforced concrete belts at the level of the floors of a brick building, reinforce the brickwork in the walls and continue the construction of the structure. Constructive measures are also used to restore the design position of individual elements of a structure without stopping the operation of a building or structure. The experience of operating industrial buildings on weak water-saturated clay and sagging soils shows that, as a result of uneven settlement of columns of industrial buildings, it is often necessary to raise (straighten) crane runways, sites for special equipment, etc.

PURPOSE OF THE STUDY

To increase the rigidity of a building, such structural schemes are usually used that are not very sensitive to uneven precipitation. So, for example, instead of continuous multi-span beams, split single-span beams are used. The overall rigidity of the building also increases with the use of monolithic reinforced concrete foundations.

Prefabricated foundation blocks are not able to redistribute efforts, therefore, if necessary, to increase the rigidity of the structure, instead of prefabricated strip foundations, monolithic strip foundations are arranged, often with a large number of longitudinal working reinforcement. To further increase the rigidity of buildings, a foundation is made of crossed monolithic reinforced concrete foundation beams, and in some cases, a solid reinforced concrete slab under the entire building or within a part of the building bounded by sedimentary joints. It is also possible to use prefabricated monolithic foundations.

Monolithic and prefabricated-monolithic foundations are able to redistribute stresses in structures of structures that arise during uneven settlement of foundations.

The spatial stiffness of buildings increases significantly with the construction of closed reinforced concrete belts, which are laid continuously at the level of all floors along the capital walls. In cases where a significant increase in the rigidity of the building is not required, it is possible to install reinforced concrete belts at the level of the basement floor and at the floor level of the penultimate floor. Interfloor floors should be anchored in reinforced concrete belts, the size of which is established based on the calculation. Usually, reinforced concrete belts are set with a height of 15-40 cm based on structural considerations (the height of a reinforced concrete belt is taken equal to a multiple of the brick size), the width, as a rule, is taken half a brick less than the thickness of a brick wall. In the southern regions of our country, where there is no danger of freezing through the body of a reinforced concrete belt, the width of the belt is taken equal to the width of the wall. Brick buildings with reinforced concrete belts allow a settlement 3-5 times greater than panel or block buildings.

When designing and building multi-storey structures or structures of great length, sedimentary seams should be arranged, which should separate the multi-storey parts of the structure from each other and divide the structures into rigid blocks of small size and simple geometric shape. The distances between the sedimentary joints are taken such that the part of the building located

between the sedimentary joints has greater rigidity. Sedimentary joints should be arranged in structures of great length, taking into account the engineering and geological structure of the construction site.
Sedimentary seams are arranged in places where the thickness of the layer of weak water-saturated clay soils changes, in places where one type of soil is replaced by another with different deformative indicators. The part of the building separated by sedimentary seams must have an almost uniform settlement, and the settlement between adjacent sections of structures can differ significantly. The locations of the sedimentary joints are also established taking into account the internal layout of the building and the change in the rigidity of the structure along the length.

The distance between sedimentary seams in structures located on a layer of weak water-saturated clay soils is taken for brick buildings equal to 45-60 m, and for panel buildings - 20-45 m. Sedimentary seams can be removed along the length of the building at different distances.

In industrial structures, settlement joints are positioned in such a way as to highlight the part of the building with a heavier operating crane mode.

When carrying out constructive measures in industrial construction, it is necessary to provide for the creation of a stock in dimensions above the bridge cranes. This is due to the fact that the buildings of industrial workshops often have an uneven settlement, especially in those cases when they are located on weak water-saturated clay soils. At the same time, precipitation increases slowly over several years and decades. For normal operation of an industrial building with overhead cranes, it is necessary to periodically straighten the crane runways on those columns that had a draft.
As a result of the lifting of the crane runways, a situation often arises in which the top of the overhead crane touches the floor trusses. In this case, it is necessary to suspend the technological process and reconstruct the workshop. When designing industrial workshops with overhead cranes, it is also necessary to provide devices for quick straightening of crane runways. For particularly critical structures, special structures and devices are required for lifting individual columns or frames of industrial workshops, as well as foundations of highly accurate machine tools.

Foundations for individual supports of high masts of power transmission lines, masts for radio and television on a layer of weak water-saturated clay soils should be connected to each other using prefabricated or monolithic reinforced concrete beams. For such structures, it is best to design pile foundations with wide grillages. In this case, it is necessary to arrange a sand cushion with a thickness of at least 20 cm under the grillage. It is also possible to use screw anchor piles.

In the body of foundations for automatic lines, it is necessary to provide for the device of brackets or specially designed stops for the possibility of jacking up and restoring the design position of the foundation of this technological equipment, followed by concreting of the raised foundation.

CONCLUSIONS

The main constructive measure in the construction of residential five- and nine-story buildings is the use of reinforced concrete and metal belts. In this case, there is a certain overexpenditure of metal, but operating costs are significantly reduced.

Constructive measures can be assigned during the construction of buildings and structures, if, as a result of various meteorological influences, shrinkage of clay soils occurs, the destruction of weak soils at the base of the foundations as a result of improper pumping of water from the pit, with the dynamic effects of construction machines in the process of movement of mechanisms along the bottom of the pits, etc. Constructive measures should also be carried out if the

development of foundation pits within the same structure is carried out to different depths or different degrees of soil destruction are observed in the foundation of buildings. In addition, if during excavation it is established that the base of the foundations is composed of soils with different properties, or a diverse occurrence of various soils is observed in it, or separate layers of weak clay soils wedge out within the contour of the structure, or within a part of the structure between deformation seams, the rigidity of the structure should be increased by constructive measures.

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INNOVATIVE ACTIVITIES OF STUDENTS IN THE EDUCATION SYSTEM OF THE REPUBLIC OF UZBEKISTAN

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ABSTRACT

The work examines the issues of IWS and develops their specifics in the educational system. A promising stage in the implementation of independent work is a production workshop. At the same time, the teacher acts as a consultant and monitors the student's activities. To stimulate and constantly maintain students' interest in obtaining new knowledge, more attention should be paid to teaching them self-education system. Students must master the basic and individual specific constituent elements of the teacher's work: work with scientific, methodological and educational literature; present educational material, compose a system of differentiated exercises and manage it in the process of solving a problem; use the techniques of posing a question, formulate organizing and governing questions, as well as versions of the same question; quickly and adequately respond to the emerging educational situation; be able to control and evaluate knowledge, etc. Independent work of students is their activity in the learning process and in extracurricular time, carried out on the instructions of the teacher, under his guidance, but without his direct participation. Putting this feature as the basis for the classification, we subdivide it into five groups: the acquisition of new knowledge and the mastery of the skills to independently acquire knowledge; consolidation and refinement of knowledge; developing the ability to apply knowledge in solving educational and practical problems; the formation of skills and abilities of a practical nature; the formation of creative skills, the ability to apply knowledge in solving educational and practical problems. Each group includes several types of TR. The relationship between groups is explained by the fact that the same types of work can be used to solve various didactic problems.

KEYWORDS: *Process, Organization, Management, Independent, Student, Decision, Development, Creative, Activity, Continuity.*

INTRODUCTION

Improving the learning process at this stage addresses the problem of organizing and managing SQI (independent work of students)

puts it in one of the first places. For its effective solution, it is important to trace the development of the doctrine of independent creative activity and the continuity in the implementation of its main provisions. If we consider this problem a little more broadly, in relation to not only students, but students in general, then we can say with confidence that it has a rich history.

In Uzbekistan, the development of ideas about independent learning began in ancient times. In the writings of Ibn - Sina (the head of medicine in the world), Al-Khorezmiy (the master of the science of algebra), Al - Koshiy (the discoverer of the concept of fractional numbers) substantiates the importance of active independent human activity for the successful development of his thinking and improving his abilities. During the period of scholasticism and dogmatism of the Middle Ages, the philosophers F. Rabelais, M. Montaigne, T. Campanella urge teachers to bring up independence in their students so that they can choose the path of knowledge themselves. In more detail, the theoretical issues of independent activity of students were considered in the works of A. Disterweg, J.J. Russo, I.G. Pestalozzi [5].

In the first case, for the teacher, the student's development process remains hidden and, therefore, uncontrollable. Due to this, the formation of knowledge, skills and abilities during the implementation of the TR, if it affects the development of the student, his creative abilities, initiative and independence, then this influence is most likely spontaneous. At the same time, learning to a large extent loses its developmental and teaching functions. The second option is also erroneous and even harmful. The stereotyped performance of etudes without a meaningful selection of educational tasks and the desire to solve them inhibits the formation of a constant perception of nature, the development of a coloristic vision, and prevents the formation of professional abilities and skills. In this case, "quantity" very rarely turns into "quality". Even bigger problems arise in the transition to creative work.

The nature of the task in TRS and the degree of its complexity at different stages of training changes. The consistent complication of tasks is due to the need for such an organization of TR in the modern educational process, in which students not only master the system of knowledge, skills and abilities provided by the program, but also develop their creative abilities, form activity and independence. However, these goals are unattainable if students do not master the methods of performing a pictorial image.

Formulation of the problem: The didactic and methodological direction in the study of this problem was initiated by the works of the Czech teacher Ya.A. Komensky [6]. Until the middle of the 19th and 20th centuries, the independent activity of students was considered in the structure of pedagogical tools and teaching methods. For the first time, it was chosen as a direct subject of study in the works of the founder of national pedagogy A. Avlony, who analyzed the independent activity of students from a philosophical and psychological standpoint and tried to consistently describe the methods of forming independence and the original concept of teaching was developed by M. Dzhumaev. He considered the maximum freedom of students to be the basis of teaching, and considered independent work as the main means of developing their creative forces and abilities in teaching mathematics. The main research of domestic scientists in the field of the problem of this in students in the 60-90s. XX century are conducted in the following areas:

- essence, process and structure, classification of types and forms of SW (VN Bessonova, M. Khaidarov, etc.) [3];
- continuity in training and readiness for SW (YK Babansky, M. Dzhumaev, etc.) [2];

- classification of skills required for SW (E. N. Kabanova-Meller, J. Ikromova, etc.) [7];
- conditions for organizing and ways to improve the efficiency of SR (SI. Arkhangelsky, E.E. Zhumaev, etc.) [1].
- The conceptual provisions of cooperation pedagogy reflect the most important trends along which education is developing in a modern school:
- transformation of the School of Knowledge into the School of Education;
- placing the student's personality at the center of the entire educational system;
- humanistic orientation of education, the formation of universal values;
- development of the child's creative abilities, his individuality;
- identifying the development and support of gifted children;
- revival of national cultural traditions;
- education of a patriot of their homeland;
- upbringing of a physically and mentally healthy person within the framework of the valeologization of the education and upbringing system;
- a combination of individual and collective education;
- setting a difficult goal.
- Based on this goal, the concept of the development of the educational system consists of a certain set of sequentially implemented programs, each of which is responsible for a certain direction of educational work.
- The design of the education system is carried out through the use of the following educational and pedagogical technologies:
- technology of organizing and conducting group educational work
- - The goal is the formation of a relatively stable relationship of a person to himself, others, nature, things. Implemented through extracurricular activities (school-wide, classroom activities);
- health saving technology
- The goal is to preserve the physical and mental health of the child and teach the skills to preserve it. It was implemented through the holding of Days of Health, school-wide competitions, actions dedicated to promoting healthy lifestyles and preventing the use of psychoactive substances, alcoholism, tobacco smoking, suicidal behavior, the spread of HIV;
- physical culture and health technologies (FOT)
- The goal is the physical development of the trainees (hardening, training of strength, endurance, speed, flexibility and other qualities that distinguish a healthy, trained person from a physically weak person). It was realized in physical culture lessons and in the work of sports sections.
- ecological health-saving technologies (EHT)
- The goal is to create environmentally friendly, ecologically optimal conditions for the life and activities of people, harmonious relationships with nature. It was implemented through the arrangement of the school territory, landscaping of classrooms, recreation, participation in environmental activities, environmental competitions;

- technology for ensuring life safety (TFELS)
- Since the preservation of health is considered in this case as a special case of the main task - preservation of life - requirements and recommendations are subject to mandatory consideration and integration into the general system of health-preserving technologies. Students' literacy on these issues was ensured by studying the BLS course.
- project learning technology
- The goal is the independent and willing acquisition of knowledge from various sources, the development of the ability to use it, the acquisition of communication skills, the development of research skills and systems thinking. It was implemented through role-playing games, school-wide actions.
- Inrmation and communication technology (ICT)
- The goal is the formation of skills to work with information, the development of communication skills of students, the preparation of the personality of an "informed society", the formation of research skills, the ability to make optimal decisions.
- ICTs are called interactive, as they have the ability to "respond" to the actions of the student and teacher, "enter" into a dialogue with them. It is implemented in the lessons of informatics and ICT, in extracurricular activities, in the independent project activities of students.
- teaching technology
- The goal is to take into account the individual characteristics of students in such a form when they are grouped on the basis of any characteristics for a separate teaching. It is implemented in the work of circles, sports sections, extracurricular activities.
- technology of social design (social education of students)
- The goal is to create conditions for social tests of personality.
- technology of personality-oriented education and training
- The goal is the development and self-development of the student, his formation as a person, taking individual characteristics, interests and abilities into account. A personality-oriented approach is a methodological position in pedagogical activity that allows, through relying on a system of interrelated concepts, ideas and methods of action, to provide and support the processes of self-knowledge, self-construction and self-realization of the child's personality, the development of his unique individuality [10].

Results

Independent work of students is divided into classroom and extracurricular. It is one of the forms of the educational process, its essential component.

The study of scientists - teachers and psychologists allows us to conditionally distinguish four levels of independent productive activity of students, corresponding to their educational capabilities:

1. Copying actions according to a given pattern. Identification of objects and phenomena, their recognition by comparison with a known image. At this level, preparation for independent activity takes place.
2. Reproductive activity for the reproduction of information about the various properties of the object under study, basically not going beyond the memory level, but involving the solution of more complex but typical problems.

3. Productive activity of independent application of the acquired knowledge to solve problems that go beyond the known pattern.

4. Independent activity on the transfer of knowledge when solving problems in completely new situations.

I believe that any independent work, at any level of independence, has a specific goal. Independent work should correspond to the student's educational capabilities, the degree of complexity, satisfy the principle of a gradual transition from one level of independence to another. The main goal of independent work is not only to consolidate, expand and deepen the acquired knowledge, skills and abilities, but also to independently study and assimilate new material without outside help. Many students experience great difficulties associated with the lack of analysis skills, note taking, working with primary sources, the ability to learly express their thoughts, plan their time and take into account the individual characteristics of their mental activity.

The teachers of the department create educational and methodological complexes (EMC) for individual disciplines - pedagogical assistance to students in independent educational and cognitive activities. Since independent work is the most important form of the educational process, teachers focus the attention of students on its direct influence on the formation of such parameters of the qualification characteristics as mobility, the ability to predict the situation and actively influence it so that students see the positive results of their work and so that success in learning contributes to transformation mediated learning in immediate interest. The formation of such motivation is facilitated by the sincere interest of teachers in the success of students.

The leadership of the independent work of students by the teacher should gradually move into self-government and self-organization of the student as a subject of learning.

One of the forms of students' independent work is course design. In order to work effectively and completely independently, students need to show activity, intellectual initiative, meaningly, they have to try to find unique non-standard approaches to the activity.

A promising stage in the implementation of independent work is a production workshop. At the same time, the teacher acts as a consultant and monitors the student's activities.

To stimulate and constantly maintain students' interest in obtaining new knowledge, more attention should be paid to teaching their self-education system. Students must master the basic and individual specific constituent elements of the teacher's work: work with scientific, methodological and educational literature; present educational material, compose a system of differentiated exercises and manage it in the process of solving a problem; use the techniques of posing a question, formulate organizing and governing questions, as well as versions of the same question; quickly and adequately respond to the emerging educational situation; be able to control and evaluate knowledge, etc. Independent work of students is their activity in the learning process and in extracurricular time, carried out on the instructions of the teacher, under his guidance, but without his direct participation.

The main features of students' independent work, with perceived information, are considered to be:

- The presence of a cognitive or practical task, problematic issue or task and special time for

their implementation, solution;

- Manifestation of mental tension of the students' thoughts for the correct and best performance of this or that action;
- Manifestation of consciousness, independence and activity of students; In the process of solving the assigned tasks;
- Possession of skills of independent work;
- Implementation of management and self-government of independentcognitive and practical activities of the student.

The core of independent work, the starting point of its construction, is a cognitive or problematic task. It is the presence of a task that determines the entire process of independent work: it provides for the independent activity of students to solve the assigned tasks; compulsory preparation for self-fulfillment, solving educational and professional tasks. In various forms of the educational process, the independence of students manifests itself in different ways: from simple reproduction, performing a task according to a strict algorithmic scheme using cursive writing techniques, speed reading, etc. to self-creativeness. The independence of students in the study of special subjects is manifested through their planning of their academic work; selection of educational literature, teaching aids for self-study; preparation of demonstration equipment and its application; fulfillment of individual educational tasks and holistic work in the specialty on samples of literature and technology without direct help and detailed instructions from the teacher [11]. The functional purpose of independent work of students in the process of lectures, seminars, practical exercises on mastering special knowledge is to independently read, view, listen, observe, take notes, comprehend, memorize and reproduce certain information. The teacher determines the goal setting and planning of independent work for the student. All information is carried out on the basis of its reproduction.

Independent work of students is also manifested in the extracurricular time, when students repeat the educational material and deepen their theoretical knowledge with the help of special literature or computer teaching devices.

Properly organized independent work of students is of great educational value. It is a defining condition for achieving high results in education, in the formation of moral qualities; serves as a primary method of converting acquired knowledge into beliefs and skills, is an important factor in the development of learning abilities, engages in self-education and is therefore a means of education and purpose.

It should be noted that for a long time the problem of SR was solved only in relation to the process of teaching at school. With regard to the educational process of the university, it began to be addressed much later.

Since the 1970s, various aspects of organizing and conducting CDS have been actively discussed at conferences of various faculties of universities in the country and are presented in collections of scientific papers.

In many studies, CDS is considered in terms of its intensification, which involves not only strengthening the teacher's activities to increase the activity of students, but also solving the whole range of issues related to improving the quality and efficiency of extracurricular work.

Expansion of controlled educational independence of students, based on SR in their free time from official classes, is the main trend in the development of the didactic process in higher education in the largest foreign countries [4].

In the USA, Germany, England, France, Austria, Japan, there are entire government structures that develop global plans and programs for student self-development. In these countries, special attention is paid to providing students with targeted assistance in self-development, knowledge of their individual characteristics, overcoming difficulties arising in the learning process and in choosing the optimal training plan.

For Western schools in the 20s - 30s. XX century characteristic didactic concepts of "reformatory pedagogy" (V. Lay, A. Binet, D. Dewey, etc.). Teachers of this period believed that it would be more correct to create a "school of action" instead of a "school of learning." The student himself must be an active participant in his own learning. Representatives of new ideas (J. Demeny. D. Dewey. G. Kershenshteiner) urge to proceed from the interests of the students themselves and to encourage their independence in every possible way. at present, these ideas of reformatory pedagogy are applied in practice in the modern schools of the West.

Scientists call the individualization of teaching and the development of creative activity and independence of students one of the leading principles of pedagogy. The latter is considered by teachers from different countries in different ways. .Dewey in his work "School and Society" notes that all learning should be conducted by self-solving students' problems and awaken their curiosity.

Existentialist educators from the USA, France, Great Britain and Germany view the principle of independence from a slightly different angle. In their opinion, it is necessary to individualize learning, understanding this as giving everyone the opportunity to go their own way and receive education to the best of their "allowed abilities." In recent years, this concept has theoretically justified many new projects in the field of learning.

To ensure the adequacy of the understanding of our research, it is advisable to consider the evolution of the concepts of TR, as well as to determine the initial positions and content of the terms that we will operate in the future. In modern philosophical, psychological, didactic and methodological literature, various aspects of TR of pupils and students are considered. However, there are certain difficulties in solving some issues. So, for example, there is no uniform interpretation of the concept of "creative work".

In our opinion, this definition also refers to traditional teaching, since it assumes a decisive role in the organization of this activity of the teacher. In the system of developing education, TR should presume the possibility of guiding a book, communicating with fellow students, and, if possible, with specialists, in our case – painters. Educational and creative work performed by a student is not deprived of the status of independence because the author consults with his supervisor, talks with friends, meaningly, takes part in expedient communication, which is creative not only in the creative process, but also in the educational process.

Considering all this, in this study, TR is understood as an educational process aimed at developing students' abilities to consciously set goals and objectives for themselves, plan their educational and creative activities, implement them and evaluate them objectively.

In our understanding, the concept of "creative work" has a double meaning. On the one hand, TR is a work that a student performs independently, it is an object of his activity. It is offered to the student by a teacher or a creative work program. On the other hand, TR is a form of manifestation of the corresponding activity of thinking, memory, and creative imagination, fantasy when a student performs an educational and creative task, which, ultimately, leads him to obtain new knowledge previously unknown to him or to deepen and expand areas of application of already acquired knowledge. In both cases, TR contributes to the development of the intellectual and creative powers of the student.

Since there is independence in any educational process: students themselves listen to the teacher's explanations, observe nature themselves, write sketches themselves, this is also TR, we will specially note that in the future we will talk about extracurricular or home TRS. Currently, the most widespread idea is that creative activity includes motivational, cognitive, emotional-volitional and reflexive components.

The motivating factors are the personal qualities of students: curiosity and creative interest, emotionality, enthusiasm, desire for creative achievements, desire for leadership, a sense of duty and responsibility, personal significance of creative activity, desire for self-education and development of creative abilities. The degree of development of these qualities characterizes the motivational and creative activity and self-activity of students.

In addition, for effective TR, it is necessary to develop students' abilities for self-government: purposefulness, the ability to plan and use time efficiently, diligence, self-control and self-assessment of abilities and achievements. Although the named motives do not exhaust their diversity, they more than others stimulate the cognitive and creative activity and independence of students, awaken their desire to work, improve their knowledge and skills.

Self-organization and self-control, that is, conscious work on oneself in order to improve one's skills, play a special role. The most important components of self-organization are a responsible attitude to business, high interest in the chosen specialty, developed self-consciousness and creative thinking.

Conclusion

The basis of TR is the connection "goal - means - control". Its success is determined by the student's ability to regulate his actions with a conscious goal. These actions, aimed at acquiring knowledge, skills and abilities, cause a certain process in the student's behavior, motivated by one or another need, serving both as an incentive and as a goal.

Thus, TRS on the subject, like any other activity, has the following structure: motive, performance and control. In a generalized form, in the structure of the TRS, one can distinguish:

1) The content side (knowledge expressed in terms or images of perceptions and ideas);

2) The operational side (various actions, operating with skills, methods and techniques);

3) The productive side (new knowledge, skills, solutions; new visual experience, ideas,

attitudes, abilities and personality traits).

All of them are interrelated and should be taken into account in the process of organizing and implementing TRS.

When performing TR, the student correlates his actions and their sequence with the requirements of the task and consciously controls his activities. The process of performing TRScarried out in the following order:

1) The allocation of goals and objectives (anticipation of the final result and determination of the general conditions for its achievement);
2) Solution of the problem (selection and application in the required sequence of adequate methods of action leading to the solution of the problem, determination of the necessary means for their implementation);
3) Self-control (comprehension of the work done: is the task set by the found and applied methods being solved, or is it necessary to correct them).

The external form of TR is a task. The internal content is an educational or creative task offered to the student at a specific stage of learning. "The essence of independent work is determined by the peculiarities of cognitive tasks embodied in the specific content of types and types of creative work" [1, p. 151].

The student mobilizes the previously acquired knowledge of the accumulated experience of activity in accordance with the task of the new exercise.

The absence of a clearly formulated task in the TR, which is often found in modern teaching practice, leads to the fact that the process of its implementation remains, at best, neutral in relation to the nature of students' creative activity. So, how many works a student independently performs, the process of his intellectual and creative development in the course of performing this work proceeds either according to the principle of "trial and error", or according to a pre-established template, familiar scheme: a certain number of similar works are performed for viewing (according to students, "for quantity"). Both of these paths are extremely ineffective.

The assimilation of educational material, as evidenced by numerous psychological studies and the data of our experimental work, occurs most effectively when it is included in the structure of creative educational activity of students in the form of interrelated educational tasks.

A more versatile approach to solving the problem of TR classification was used in the work of A.V. Usova [2]. Unlike previous authors, it does not exclude the possibility of classifying TR types according to various attributes. It is only necessary that the selected feature is the most important in solving a particular pedagogical problem. For example, the author proposes to classify TR according to the main didactic goal.

Putting this feature as the basis for the classification, we subdivide it into five groups: the acquisition of new knowledge and the mastery of the skills to independently acquire knowledge; consolidation and refinement of knowledge; developing the ability to apply knowledge in solving educational and practical problems; the formation of skills and abilities of a practical nature; the formation of creative skills, the ability to apply knowledge in solving educational and

practical problems. Each group includes several types of TR. The relationship between groups is explained by the fact that the same types of work can be used to solve various didactic problems.

The above review of various directions and approaches in solving the problems of determining and classifying TR proves that these problems have attracted and continue to attract the attention of methodologists and didactics.

IWS is an obligatory component of educational activities, therefore, it needs a thorough methodological study and recommendations for its organization at faculties and departments. Analysis of the methodological literature showed that the problems of independent activity are developed in theoretical terms rather deeply. However, the specifics of universities are different, so it is impossible to find the same solutions for everyone.

Earlier, I described some of the methods of students' perception of information. And I agree with those methods that require that, in addition to lectures and textbooks, the student also pays attention to special literature, electronic library, etc. I believe that the student most fully and deeply perceives only the information that he himself used and improved in the process of his activity, and no one will force him to perceive and process it if he does not want to.

One of the most important principles of modern university education is the ability to independently “learn to learn”.

To develop a program of independent work of students and systematically monitor its implementation for each course, again in the context of teaching drawing, but , in our opinion, this is just as important when organizing the educational process in other special disciplines of mathematical education.

With regard to the study of the foundations of mathematics at the Faculty of Physics and Mathematics, the SRS system has not yet been the subject of special research and requires a comprehensive study.

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APPLICATION OF INTERNET OF THINGS IN AGRICULTURE

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ABSTRACT

The Internet of Things (IoT) is a concept that enables physical devices with computational and sensory support to communicate with one another and access Internet-based services. The Internet of Things (IoT) concept was developed to link gadgets through the Internet and make information more accessible to consumers. IoT has a broad variety of possible applications, including agriculture, where IoT will be used extensively in the future. The purpose of this paper was to introduce the Internet of Things (IoT) idea as a foundation for monitoring and control systems utilized in agricultural production operations. IoT devices are important, with an emphasis on implementing them using existing microcontroller platforms and suitable sensors, such as Arduino products. In monitoring systems, autonomous sensor devices collect data and participate in the control process by providing signals to actuators. Users may remotely monitor conditions and manufacturing processes using an IoT-based solution like this. This technology allows customers to save money on inputs, reduce costs, and track the production process on the farm.

KEYWORDS: *Agriculture, Arduino, Drones,Internet of Things, Monitoring.*

1. INTRODUCTION

Every item that can be controlled via the internet is an Internet of Things (IoT) device. Wearable IoWT (Internet of Wearable Things) gadgets like smartwatches and home management solutions like Google Home have made IoT devices very popular in consumer markets. By 2020, it is expected that over 30 billion gadgets will be linked to the Internet of Things. IoT applications in farming are aimed at traditional agricultural activities in order to satisfy rising demand and reduce output losses. Robots, drones, remote sensors, and computer imagery, in combination with ever improving machine learning and analytical tools, are used in agriculture to monitor crops, survey and map fields, and give data to farmers for sensible farm management plans that save time and money[1]. Agriculture uses IoT to get insights and monitor farms via the use of robotics, drones, sensors, and computer imagery combined with analytical tools. Physical equipment placed on farms monitors and collects data, which is then utilized to get insights.The Internet of Things (IoT) is the concept of using the Internet to link physical items with sensing, networking, and computing capabilities to other objects and services. Although the fundamental

idea behind IoT isn't new, IoT makes advantage of a wide range of devices and their network connectivity via the Internet. As a result, the IoT idea guarantees that any device is accessible through the Internet, resulting in significant changes in terms of network interconnections .Agricultural crop production and domestic animal breeding have both been impacted by technology advancements in the past decade[2]. Farmers may get information on soil humidity, nutrient condition in the soil, and the presence of plant diseases and pests in plants using different sensors and wireless devices. Farmers can respond quickly and take appropriate action based on the information they have received. Sensors collect data on the operation of agricultural equipment, allowing operators to adapt machine operation to working circumstances in order to improve the efficiency and quality of the production process[3]. IoT gives conventional agriculture a new perspective on production, focusing on the information network, which includes automation, the use of intelligent devices, and their networking in the agricultural production process. Improvements in the efficiency of inputs such as soil, water, fertilizers, pesticides, and other inputs, as well as lower production costs, improved profitability, sustainability, food safety, and environmental protection are all advantages of IoT applications in agriculture[4]. Farmers can distribute their products to consumers on a large scale because to the Internet of Things. This has the potential to alter the supply chain, making it more directed and shorter from the place of production to the customer. The goal of this paper was to introduce the Internet of Things (IoT) idea in a monitoring and control system model for agricultural production operations. Furthermore, the emphasis is on IoT device definitions and implementations using available microcontroller platforms, shields, and suitable sensors, such as Arduino products[2]. IoT nodes are built on Arduino platforms with readily accessible shields and suitable sensors, as well as strong library support[4].

Demonstrated a gateway platform that allows physical things to connect to the Internet.The suggested architecture was implemented on Arduino platforms and specifies the development of Internet of Things services that allow local sensors to be accessible through LAN or the Internet. Arduino-based sensor devices link to LAN networks, allowing them to be accessed. This is accomplished by embedding Ethernet or Wi-Fi modules into sensor devices, enabling them to communicate with one another. For Ethernet connections, the Arduino ENC28J60 Ethernet Module is utilized, while the ESP8266 Module is used for wireless connectivity.

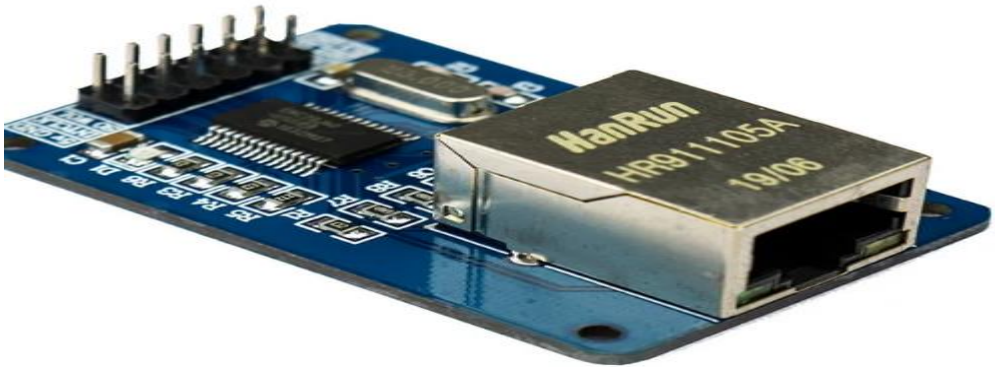

Figure 1: Diagrammatic Representation of Arduino ENC28J60 Ethernet Module [ELECTRONIC HUB]

To meet network protocol requirements, the Ethernet module utilizes a new Microchip ENC28J60. The SPI interface connects the module to most microcontrollers. It features a +3.3 V power supply and a transmission rate of up to 20MHz (ENC28J60 Ethernet).depicts the Arduino Ethernet. It includes an Arduino development board based on the ATmega328 microcontroller, as well as an Ethernet interface on the same board. An external power source, an optional PoE module, or an FTDI cable/USB Serial connection are used to power this board (Arduino

Ethernet). The ESP8266 is a WiFi networking solution that allows you to connect your microcontroller to the internet [5]. It also has the ability to execute several programs at the same time. The following are the specifications for the ESP8266 Module: 3.3V power supply, 32K + 80K RAM, 80-160MHz CPU, and 802.11 b/g/n/d/e/i/k/r support The transmitting current consumption may be as high as 170mA at full power, yet just 10uA in sleep state This module's battery power source may include a solar panel for battery recharge.

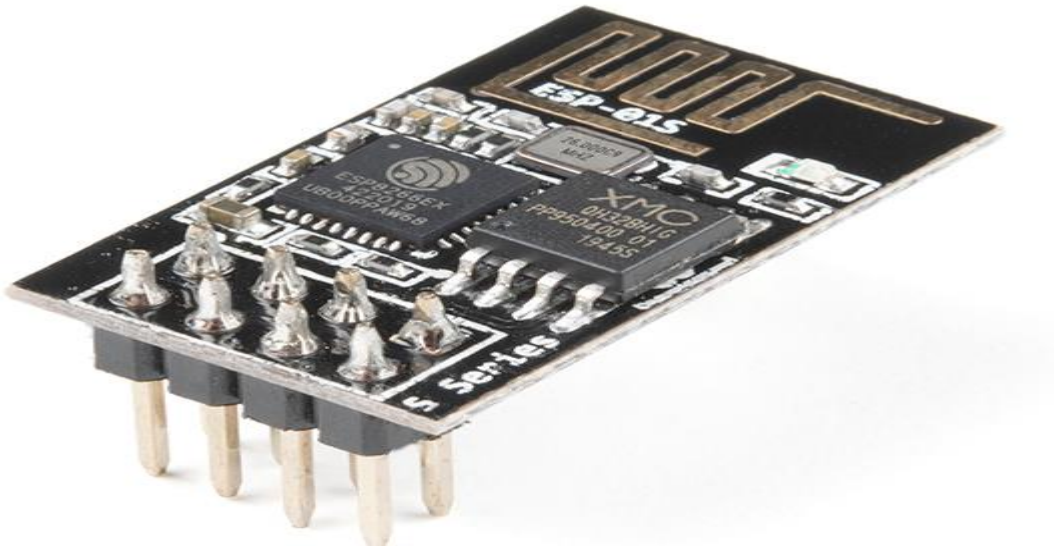

Figure 2: Diagrammatic Representation of ESP8266 Wi-Fi Module [ELECTRONIC HUB]

1.1 **Application Of IoTinAgriculture:**

- **Precision Farming:**

When it comes to producing animals and cultivating crops, precision farming may be defined as anything that makes agricultural practices more regulated and precise. The utilization of IT and other things such as sensors, control systems, robots, autonomous vehicles, automated hardware, variable rate technologies, and so on is a major component in this approach to farm management. Precision agriculture is characterized by the use of high-speed internet, mobile devices, and dependable, low-cost satellites (for imaging and location) by the manufacturer, to name a few important technologies.Precision agriculture is one of the most well-known IoT applications in the agricultural industry, and many companies use it all around the globe. CropMetrics is a precision agriculture company that focuses on cutting-edge agronomic solutions and specializes in precision irrigation management. CropMetrics' products and services include VRI optimization, soil moisture probes, and the virtual optimizer PRO, among others. VRI (Variable Rate Irrigation) optimization improves yields and enhances water usage efficiency on irrigated agricultural areas with topographical or soil variability. The soil moisture probe technology offers full in-season local agronomy assistance as well as suggestions for water usage efficiency optimization. The virtual optimizer PRO integrates different water management technologies into a single, cloud-based, and powerful location enabling consultants and farmers to take advantage of precision irrigation advantages via a simple interface.

- **Agricultural Drones:**

Agricultural drones are an excellent illustration of how technology has evolved through time. Agriculture is becoming one of the most common sectors to use drones. Drones are being utilized in agriculture to improve a variety of farming techniques. Crop health evaluation, irrigation, crop monitoring, crop spraying, planting, and soil and field analysis are some of the

ways drones are utilized in agriculture, both on the ground and in the air. Crop health imaging, integrated GIS mapping, simplicity of usage, time savings, and the potential to improve yields are all advantages of utilizing drones. Drone technology will offer the agricultural sector a high-tech makeover with strategy and planning based on real-time data gathering and processing. PrecisionHawk is a company that utilizes drones to collect useful data through a set of sensors that are used for agricultural land imaging, mapping, and surveying. In-flight monitoring and observations are carried out by these drones[6]. Farmers select the land they want to survey and choose an altitude or ground resolution. Plant health indices, plant counting and yield prediction, plant height measurement, canopy cover mapping, field water ponding mapping, scouting reports, stockpile measuring, chlorophyll measurement, nitrogen content in wheat, drainage mapping, weed pressure mapping, and so on can all be derived from drone data. During the flight, the drone gathers multispectral, thermal, and visual images before landing in the same area from where it took off.[7]

- **Livestock Monitoring:**

Wireless IoT apps may be used by large farm owners to gather data on their cattle's whereabouts, well-being, and health. This information assists them in identifying ill animals so that they may be removed from the herd, avoiding disease transmission. Ranchers may use IoT-based sensors to find their livestock, which reduces labor expenses. JMB North America is a company that provides cattle farmers with cow monitoring systems[8]. One of the options aids cattle owners in observing pregnant cows on the verge of giving birth. When the heifer's water breaks, a sensor powered by a battery is ejected. This communicates with the herd manager or rancher. The sensor allows farmers to be more focused when working with heifers who are giving birth.

- **Smart Greenhouse:**

Greenhouse farming is a technique for increasing the production of vegetables, fruits, and other crops. Manual intervention or a proportional control system are used in greenhouses to regulate environmental factors[9]. These techniques are less successful since human intervention leads in production losses, energy losses, and labor expenses. With the assistance of IoT, a smart greenhouse may be created; this design automatically monitors and regulates the temperature, removing the need for human intervention. Different sensors that monitor environmental factors according to the plant need are utilized to regulate the environment in a smart greenhouse. When the system is linked through IoT, we may set up a cloud server to provide remote access. This removes the need for ongoing manual supervision. The cloud server also processes data and performs a control action within the greenhouse. With little human involvement, its design offers farmers with cost-effective and optimum solutions. Aluminum Greenhouses is a drip irrigation and Agri-Tech greenhouse company that provides services using cutting-edge technology. It utilizes solar-powered IoT sensors to create contemporary and inexpensive greenhouses. The condition of the greenhouse and water usage may be tracked with these sensors through SMS notifications to the farmer via an internet site. In these greenhouses, automatic irrigation is used.Lightlevels; pressure, humidity, and temperature are all measured by IoT sensors in the greenhouse. These sensors may automatically operate the actuators to open a window, switch on lights, regulate a heater, turn on a mister, or turn on a fan, all through a Wi-Fi connection.

2. LITERATURE REVIEW

P. Prabavathi[2]proposed that Modernization of the farming process is one of the most important steps for a country like India, which has to import a large amount of grains other agricultural products from other countries to meet the demands of its 1.2 billion people. One of the most challenging aspects of agribusiness is determining the soil's health, nature, and changing the water system and plant clear according to this view. Horticulture issues are wide open, and agriculturists have been blocking progress for a long time. Rural modernisation is the primary

solution to these problems. Another example is providing protection in fields or grain storage against rat or creepy crawly attacks. Farming modernization is realized via a 'Web of Things'-based device that is capable of detecting data and sending it to the client. This device can be operated and monitored from afar to ensure the security of grain storage and agricultural areas.

K. E. Nalina and R. Kaliwal[10]proposed that IoT (Internet of Things) is a current and future developing technology. It functions as a common network that connects items and things via the internet. The Internet of Things (IoT) aids farmers in resolving significant issues. Due to India's overpopulation and lack of rainfall, agriculture is the primary source of income for farmers. We are having difficulty sustaining our everyday supplies such as water, food, and crops, among other things. To address these issues, we devised this project, which combines IoT with a low-cost system for monitoring soil characteristics in agricultural fields, such as soil condition, temperature, and humidity. This system includes an ESP8266 Wi-Fi module, an Arduino UNO microcontroller, GSM, and Arduino-based sensors. The system is GSM-enabled, allowing data to be sent to a user's mobile phone through SMS.

S. Gavaskar and A. Sumithra[9]proposed that Because the issue of agriculture is now solved manually, there are more opportunities for farmers to lose money. Agriculture is now shrinking as a result of increased pollution and pests across the globe. The majority of farmers in India cultivate sugarcane; however it does not yield owing to bugs and larvae in the sugarcane. To prevent this, the suggested design includes an acoustic sensor as well as a pir sensor. The noise and temperature were monitored using an Arduino in this suggested design system. As a result, locating the issue may be simplified and addressed quickly.

3. DISCUSSION

In agriculture, IoTs have been used to increase agricultural yields, enhance quality, and lower expenses. For these reasons, we suggest in this article that WSNs be used to irrigate crops. We devised and developed a method for regulating environmental variables in agricultural fields.The hardware, online application, and mobile application were all part of the system. The initial component was planned as a control box and executed. This control box included both hardware and an electronic control system for connecting to sensors and obtaining agricultural data. The control box was created with real-world testing in mind. In this research, the implemented design linked to and received IoT data from any field. The web-based application, which was developed and built to modify crop data and field information, was the second component. Large-scale data from the Internet of Things is stored and analyzed in this phase. This study made a significant contribution by using data mining with association rules to find valuable information on the impacts of the environment and climate. The temperature range for excellent production of homegrown veggies and lemons was found to be between 29 and 32 degrees Celsius. Furthermore, the ideal humidity for maximum lemon production was between 72 and 81 percent.The last step was to use a smartphone application to manage the crop irrigation. This provided the user with both automated and manual functional control. For watering, the user may utilize the automated feature, which is based on data from soil moisture sensors. In the functional control mode, however, manual control was feasible. The system used the LINE application's LINE API to send alerts.

4. CONCLUSION

This article examines the literature on IoT in agriculture and offers an overview of current applications, enabling technology, and the major obstacles that lie ahead. The study reveals that the topic drew a lot of interest from the scientific community, particularly in China. Food supply networks and arable farming are the most often discussed topics. The significance of food safety and food quality management explains the prevalence of papers dealing with food supply networks. The focus on arable farming may be explained by the fact that IoT is often seen as a

next step in the evolution of the precision agriculture idea. Furthermore, exploratory articles and research that showcase IoT systems that are developed or deployed in prototypes or pilots predominate in the examined literature. The articles examined are mostly concerned with sensing and monitoring, with actuation and remote control receiving little attention.When it comes to connection, the focus is on various kinds of wireless sensor networks. The majority of IoT applications concentrate on fundamental functions such as tracking, tracing, monitoring, and event management. These results show that, although the Internet of Things is gaining traction, it is still in its infancy in the agricultural and food industries. Applications are often fragmented, lack smooth integration, and are still in the experimental stage of development, particularly for more sophisticated solutions. Integration of existing IoT solutions with open IoT architectures, platforms, and standards, (ii) upscaling the use of interoperable IoT technologies beyond early adopters, particularly through the simplification of existing solutions and making them more affordable for end users, and (iii) further improvement of IoT technologies to ensure a b The majority of generic technological components to solve these problems should be accessible soon. Agriculture and food will be transformed into smart webs of linked items that are context-sensitive and can be recognized, sensed, and controlled remotely as a result of the Internet of Things. This is anticipated to have a significant impact on agri-food processes, resulting in new regulatory mechanisms and economic models. As a result, we think that the Internet of Things (IoT) will be a game changer in agriculture and the entire food chain, significantly increasing production and sustainability. For example, IoT will assist farmers in transitioning to data-driven farming, which will be aided by decision-making tools that use real-time and accurate operational data. As a consequence, farms may shift from a supply-oriented, cost-driven, anonymous strategy to a value-based, information-rich one in which demand and supply are constantly matched. Farms and food supply chains may eventually become self-adaptive systems in which smart, autonomous things, such as agricultural equipment, can function, decide, and even learn without human involvement on-site or remotely.

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A BRIEF REVIEW ON THE NANOTECHNOLOGY AND ITS APPLICATIONS

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ABSTRACT

The application of nanotechnology in electronics is known as nanoelectronics, where nano refers to a very tiny range that cannot be seen with the human eye. Nano represents a diverse collection of devices, materials, instruments, and equipment, all of which have at least one comparable or common characteristic: their size is so tiny that their interatomic interaction and quantum mechanical characteristics must be investigated. Nanotechnology is a broad phrase that encompasses a wide range of disciplines such as science, research, and technology. Nanotechnology is also utilized in the food sector, as well as in information and communications technologies and electronics. Nanotechnology is concerned with the handling of tiny objects and processes. This study discusses one of the nanoparticles known as cantilever, as well as its use, limitations, and future need. This effect is also shown in this article, where the output of a cantilever changes as its energy level changes. Nanotechnology is an area of research that entails the study, design, manipulation, production, and control of materials, devices, and equipment using physical or chemical methods. Nanotechnology has been used to a variety of applications, including industry and medicine. Many therapeutic devices, including nanotechnology, are utilized to cure cancer; nanotechnology targets cancer bacteria or cells exclusively, causing no damage to healthy tissue; nanotechnology may also be employed in pharmaceutical goods, namely sunscreen. This research paper looked at the science underlying nanotechnology and how it may be used to various fields such as industry and medicine.

KEYWORDS: *Small, Micro, Molecular Study, Nano Electronics, Quantum Dots, Nanoscale, Quantum Size Effect, Fullerene, Quantum Computers.*

INTRODUCTION

Nanotechnology is essentially the study of molecules, as shown by the fact that it involves the manipulation, design, and creation of matter. Different types of force are applied to atoms and molecules so that their properties can change according to the needs of industry. Because the size of particles is very small in nanometers and the study of this is very complicated, scientists and engineers are occupied with resolving the atoms and their bonds' complexity[1].

The application of nanotechnology in electronics is known as nanoelectronics, where nano refers to a very tiny range that is not visible to the human eye[2]. Nano represents a diverse collection of devices, materials, instruments, and equipment, all of which have at least one comparable or common behavior: they are very tiny in size, so small that their interatomic interactions and quantum mechanical characteristics must be studied. Nanotechnology is a broad phrase that encompasses various areas such as science, research, and technology [4]. In addition to the food sector, nanotechnology is utilized in information technology and electronics. Nanotechnology is concerned with working with tiny objects and performing small processes[3].Fig 1 shows the structure and design of nanoparticle it's basically for the molecules and atoms.

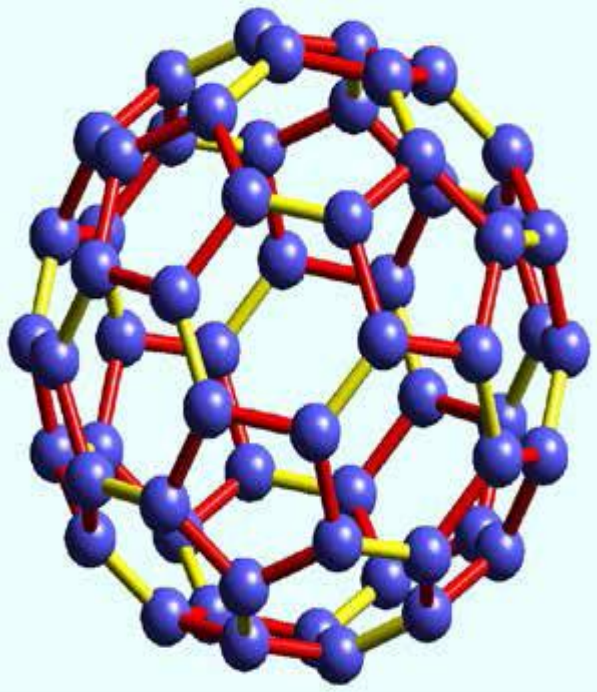

Fig 1: The Structure and Design of Nanoparticle It's Basically for the Molecules and Atoms.

Nanotechnology is the study based on nanoparticles; Fig 1 shows the structure and design **of** nanoparticle it's basically for the molecules and atoms of any matter, there are many different types of nanoparticle presents and all nanoparticle have different industrial application as shown in the figure 2, among all the nanoparticle one nanoparticle named cantilever has been discussed in this paper also its application and output of the application shown in this paper[4].

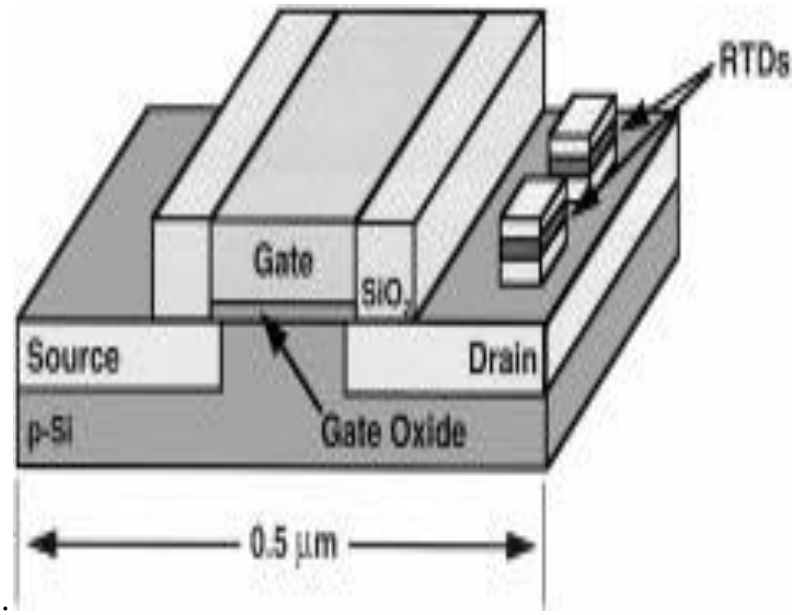

Fig 2.1:All Nanoparticle have Different Industrial Application.l

Nanotechnology has different application and potential field of work like it is also used in textile such as Nanotechnology can be defined as the tool of measurement, prediction and construction of materials of different properties by playing or changing their atomic or molecular behavior, the scale of their change is in nanometers[5]. Atoms and groups of atoms called molecules are very small in nature also their small size creates complexity in work so scientists and engineers are trying to take control of these small particles also they take control over atoms and molecules individually, manipulating them to use with an extraordinary degree of precision[6].The mutation stage 1 and 2 is shown in the Figure 3 and Figure 4.

- Antibacterial/ odor control
- Computing
- UV blocking
- Strength enhancement
- Wrinkle resistance
- Antistatic properties
- Sensors
- Optical displays
- Water repellent

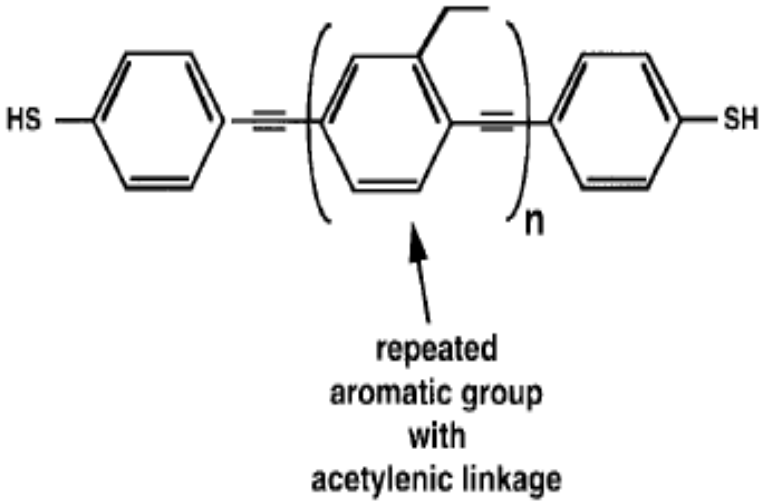

Fig 3: Molecular Mutation (stage 1)

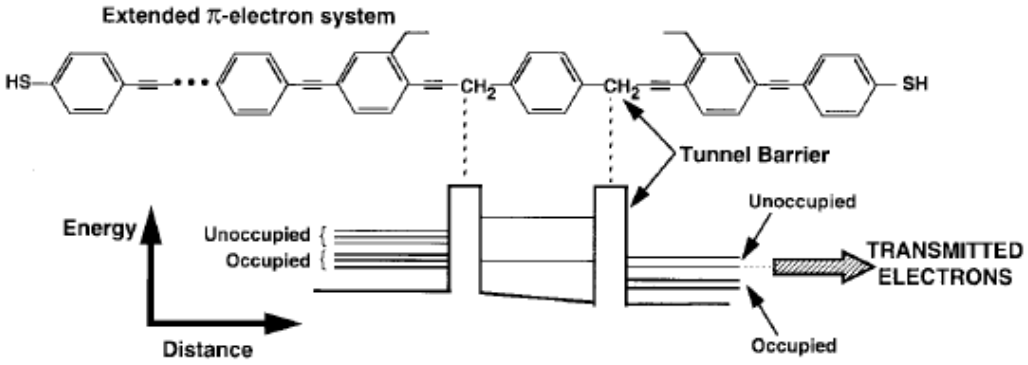

Fig 4: Molecular Mutation (stage 2)

Atomic Power AFM used to put force on the atom of matter so that its characteristics and work change. Microscope is a device that operates on the concept of nanotechnology in which a force is placed on the atomic portion of the sample matter. shows a list of nanotechnology-based modality and potential applications, and table 1 shows which nanoparticles have been used for which technology or purpose, such as quantum dots, which is a nanoparticle used for optical detection of gene and protein in animals and cells assays, and in tumor and lymph node visualization, and nanowire, which is a nanostructure used for tumor and lymph node visualization. Nanoshells are a type of nanoparticle that is used for tumor specific imaging. Nanoparticles are defined as small particles of matter that have a wide range of applications in industry, including targeted drug delivery permeation enhancers, MRI and ultrasound image contrast agents, and reports of apoptosis and angiogenesis, among others. Dendrimers are repetitively branched molecules that are used in the application of targeted drug delivery permeation enhancers, MRI and ultrasound image contrast agents [7].

LITERATURE REVIEW

Many research papers have been published in the field of nanotechnology and its application in medical and industrial processes. In a research paper titled an introduction to nanotechnology

and its implications by Shree KantaSubedi Department of physics, Prithivi Narayan campus, Pokhara, the author discusses the study of nanotechnology and its historical background, as well as the use and implications of nanotechnology. This paper has shown nano particles such as carbon nanotubes and buckyballs. Nanotechnology can be used in many sectors, one of which is the energy sector. Nanotechnology also has a very broad career and opportunity, so it is used in the development of quantum computers. Nanotechnology can also measure reactivity and strength of materials [8].

In a research paper titled Overview of Nanoelectronic Devices, David Goldhaber-Gordon, Michael S. Montemerlo, J. Christopher Love, Gregory J. Opiteck, And James C. Ellenbogendiscussed the molecular structure that has been studied in nanotechnology, as well as the different sizes of the particle that fall into which range of nanotechnology. Which are based on the nanotechnology concept, Discussed are the structure and operation of a MOSFET, Obstacles to Further Miniaturization of FETs, solid state quantum effect and single electron nanoelectronic device, and the study of RTD (resonant tunneling diode), graph and structure, nanoelectronic device taxonomy, and molecular electronic switching devices. This research article also covers electronics molecules, providing a short overview of the types of technologies utilized to investigate molecules, as well as the many methods and perspectives on materials that nanotechnology may provide [9].

NSI addressed the idea for future high-performance hybrid nanophotonic devices in a research article titled Highlights from the Nanoelectronics for 2020 and Beyond (Nanoelectronics) with a nice graphic of the same, Reversible molecular switch created by Bissel et al. As explained in the text, ring-like "bead" molecules move along wire-like chain molecules to accomplish switching operations. In this study article Reversible molecular switch created by Bissel et al., nanotechnology was also utilized to run large operations by altering tiny molecules' behavior on a very small scale. As explained in the text, a ring-like "bead" molecule moves along a wire-like chain molecule to provide a switching function [10].

DISCUSSION

The application of nanotechnology in electronics is known as nanoelectronics. Nano refers to a very tiny range that is not visible to the human eye. Nano represents a diverse collection of devices, materials, instruments, and equipment, all of which have at least one comparable or common characteristic: their size is so tiny that their interatomic interaction and quantum mechanical characteristics must be studied. Nanotechnology has a wide range of applications in engineering, medicine, and industry because atomic control is a very excellent and effective instrument for the future. Nanotechnology has the ability to ignite and transform us from head to toe by implementing and bringing about a variety of complicated alterations. Many complicated and difficult interactions occur at a very tiny scale thanks to nanotechnology. The application drawbacks and output waveform of the cantilever waveform are shown in this paper. Cantilevers are used for a variety of applications, including high throughput screening, disease protein biomarker detection, DNA mutation detection [SNPs], and gene expression detection. They are also used to apply force to atoms and molecules, as well as to create contact between molecules. While increasing or reducing energy and total system enthalpy, the output waveform of current is illustrated with various values of current waveform.

Because it includes the manipulation, design, and production of matter, nanotechnology is basically the study of molecules. Atoms and molecules are subjected to various kinds of force in order for their characteristics to alter in response to industrial demands. Scientists and engineers are preoccupied with resolving the intricacy of atoms and their connections since particle sizes are extremely tiny in nanometers and studying them is quite difficult. Nano electronics is the use of nanotechnology in electronics, where nano refers to a very small range that is not visible to

the naked eye. Nano is a broad term that refers to a wide range of devices, materials, instruments, and equipment that all have at least one similar or common characteristic: they are very small, so small that their interatomic interactions and quantum mechanical properties must be investigated. Nanotechnology is a wide term that refers to a variety of fields, including science, research, and technology. Nanotechnology is used in information technology and electronics, in addition to the food industry. Working with little things and executing small processes is what nanotechnology is all about.

Atomic Force Microscopy (AFM) is a technique for applying force to an atom of matter in order to alter its properties and work. A microscope is a device that uses nanotechnology to apply a force to the atomic fraction of a sample matter. such as quantum dots, a nanoparticle used for optical detection of gene and protein in animals and cells assays, as well as tumour and lymph node visualisation, and nanowire, a nanostructure used for tumour and lymph node visualisation.

CONCLUSION

Nanotechnology is the study of nanoparticles; it is primarily for molecules and atoms of any matter. There are many different types of nanoparticles present, and each nanoparticle has a different industrial application. Among all the nanoparticles, one nanoparticle named cantilever has been discussed in this paper, as well as its application and output. Nanotechnology may be described as a technique for measuring, predicting, and building materials with various characteristics by manipulating or altering their atomic or molecular behavior on a nanoscale scale. Because atoms and molecules, which are groups of atoms, are very small in nature and their small size creates complexity in work, scientists and engineers are attempting to gain control of these small particles. They also take control of atoms and molecules individually, manipulating them to use with extraordinary precision. Nanotechnology has a wide range of applications in engineering, medicine, and industry because atomic control is a very excellent and effective instrument for the future. Nanotechnology has the ability to ignite and transform us from head to toe by implementing and bringing about a variety of complicated alterations. Many complicated and difficult interactions occur at a very tiny scale thanks to nanotechnology. Nanotechnology will impact the lives of virtually every person on the globe in the next several years if it continues to develop at its present pace, making it the biggest breakthrough in human history.

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AN ANALYSIS OF PROTEOMICS AND ITS APPLICATIONS

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ABSTRACT

Proteomics is the study of the identification and measurement of total protein content in a cell, tissue, or organism using various methods. It works in tandem with other "omics" technologies like genomics and transcriptomics to determine the identification of an organism's proteins and to understand their structure and activities. Proteomics-based technologies are used in a variety of research settings, including the detection of various diagnostic markers, vaccine candidates, pathogenicity mechanisms, the alteration of expression patterns in response to various signals, and the interpretation of functional protein pathways in various diseases. Proteomics is very complicated since it entails analyzing and categorizing a genome's total protein signatures. Mass spectrometry, with LC–MS–MS and MALDI-TOF/TOF as common equipment, is at the heart of today's proteomics. However, the expenses of using proteomics facilities, such as software for equipment, databases, and the need for trained people, significantly rise, limiting their usage, particularly in poor countries. Furthermore, because of intricate regulatory mechanisms that regulate protein expression levels, the proteome is extremely dynamic. This study aims to explain the different proteomics methods, as well as their current advancements and applications in research and analysis.

KEYWORDS:*Amino Acid, Polypeptide, Protein, Proteomics.*

1. INTRODUCTION

Protein is a very complex molecule found in all living things. Amino acid polymers make up proteins. In 1902, Emil Fischer and Franz Hofmeister published a paper on proteins. Proteins serve a crucial part in metabolic processes. The sequence of particular amino acids transcribed by mRNA determines the primary structure of a protein, which guides the correct folding of the polypeptide chain into the secondary structure. The alpha helix, a portion of the polypeptide that folds into a corkscrew form, is one kind of secondary structure. Beta strands are polypeptide linear structures that link together to create a flat beta sheet. The final protein is formed when turns and coils interact chemically to produce the unique three-dimensional shape of the appropriate three-dimensional structure. Many proteins, on the other hand, are made up of several polypeptide subunits that combine to form the final active protein. The quaternary structure of these proteins is formed through interactions between the various subunits. One of

the most hopeful outcomes of research into human genes and proteins has been the discovery of possible novel medicines for illness therapy. To discover proteins linked to a disease, this method uses genome and proteome data[1].

The word "proteomics" was originally used in 1995 to describe the large-scale characterisation of a cell lines, tissues, or organisms complete protein complement. Proteomics is the study of proteins on a large scale, focusing on their composition, shapes, functions, and connections with the proteins that control cell activities2, 3. Proteomics is the primary topic of attention since it provides a greater knowledge of an organism than genomics. Genomics may provide an approximate estimate of a protein's expression. The majority of proteins work in tandem with other proteins, and one of the primary goals of proteomics is to determine which proteins interact. Proteomics is frequently seen as the next stage in the study of biological systems after genomics. It's considerably more difficult than genomics, owing to the fact that, although an organism's DNA remains relatively consistent throughout time, the entire protein expression profile varies with time, micro and macro environmental circumstances[2]. In forensic science, mass spectrometry (MS) has been extensively employed to identify substances, especially illegal narcotics. MS is a method for detecting substances that uses a mass spectrometer to separate ions based on their unique mass (mass-to-charge ratios). The technique works by assuming that each chemical has a distinct fragmentation pattern (mass spectrum). The sample is ionized, and the ions in it are sorted depending on their mass and relative abundance.

1.1 Types of Proteomics:

1.1.1 Expression proteomics:

Under two distinct circumstances, expression proteomics is utilized to investigate the qualitative and quantitative expression of total proteins. The protein that is accountable for the stress or sick condition, or the protein that is expressed owing to illness, may be compared between normal and treated or diseased cells. In most cases, expression proteomics investigations are used to look into the patterns of protein expression in aberrant cells. Ex. Differential protein expression may be evaluated by comparing tumor tissue samples to normal tissue samples. The protein expressional alterations, which are present and missing in tumor tissue as compared to normal tissue, were detected using 2-D gel electrophoresis and mass spectrometry techniques. Protein activities, multi-protein complexes, and signaling pathways may be used to determine which proteins are overexpressed and which are underexpressed. The discovery of these proteins will provide important knowledge about the molecular biology of tumor development and disease-specific ways to utilize these proteins as diagnostic markers or therapeutic targets[3].

1.1.2 Structural Proteomics:

Structural proteomics aids in the understanding of functional proteins' three-dimensional shape and structural complexities. When a protein's amino acid sequence is determined directly by sequencing or from the gene using a method called homology modelling, structural prediction is made. The structure and function of protein complexes found in a specific cellular organelle can be determined using structural proteomics. It is possible to identify all of the proteins present in a complex system, such as membranes, ribosomes, and cell organelles, as well as characterize all of the possible protein interactions between these proteins and protein complexes. For structure determination, various technologies such as X-ray crystallography and NMR spectroscopy were primarily used[4].

1.1.3 Functional Proteomics:

Understanding protein activities as well as unrevealing molecular processes inside the cell is explained by functional proteomics, which is dependent on the discovery of interacting protein partners. In fact, the interaction of an unknown protein with partners from a specific protein

complex engaged in a specific mechanism would strongly indicate its biological role. Furthermore, the in-vivo clarification of protein-protein interactions may significantly improve comprehensive descriptions of cellular signaling networks[5].

1.2 Techniques Involved In Proteomics:

To characterise protein structure and functions in proteomic study, both analytical and bioinformatics techniques were utilised. 2D gel electrophoresis and MALDI-TOF-MS were utilised as analytical methods. A variety of software programmes were utilised in the field of bioinformatics.

1.2.1 2-D Gel Electrophoresis:

Protein samples are resolved in 2-D gel electrophoresis based on charge in a process known as isoelectric focusing, and then by molecular weight in a second phase known as molecular weight focusing. The result is a picture made up of thousands of tiny dots, each of which represents a different protein. A good two-dimensional gel can resolve 1,000 to 2,000 protein spots, which appear as dots in the gel after staining. The method of 2-D gel electrophoresis is mostly used to analyze two comparable samples and identify particular protein differences[6].

1.2.2 2-D Electrophoresis Workflow Chart:

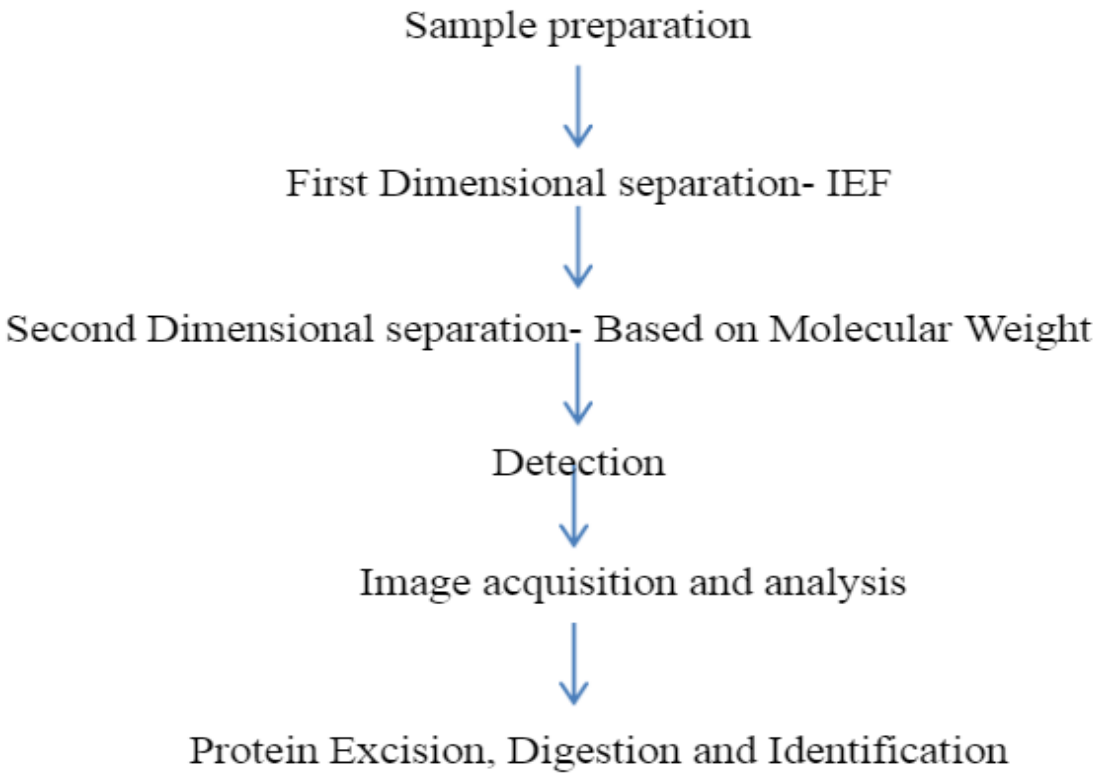

Figure 1: Representation of workflow chart of 2-D Electrophoresis.

Figure 1 represents workflow chart of 2-D Electrophoresis. Prepare the protein at an appropriate concentration and in a solution for IEF. Select a technique that preserves the natural charge, solubility, and relative abundance of your target proteins. IEF should be used to separate proteins based on their pI. For the required resolution and sample load, choose the suitable IPG strip length and pH gradient. Choose the best loading and separation parameters for your samples. SDS-PAGE is used to separate proteins based on their size. Choose the right size, composition, and separation conditions for your gel. Use a complete protein stain or fluorescent protein tags to see proteins. Select a staining method that is compatible with the sensitivity requirements and

imaging equipment available. Using suitable photographic equipment and software capture digital pictures of the 2-D designs. Then, using 2-D software, examine the patterns. Extraction of protein spots of interest from the gel, digestion of the proteins, and MS analysis of the digests.

1.2.3 MS Analysis:

Mass spectrometry is an analytical method that generates spectra of the masses of atoms or molecules in a material sample. The spectra are used to figure out a sample's elemental or isotopic signature, particle and molecule masses, and the chemical structures of molecules like peptides and other chemical compounds. Mass spectrometry measures the mass to charge ratios of charged molecules or molecule fragments generated by ionizing chemical substances. For protein identification, MALDI-TOF is the most effective method[7].

1.2.4 MALDI-TOF-MS:

Matrix Assisted Laser Desorption/Ionisation (MALDI) is a soft ionization method used in spectrometry to analyze biomolecules such as DNA, protein, and peptides. Because biomolecules and synthetic polymers have low volatility and are thermally fragile, the use of MS for characterisation has been restricted. The advent of MALDI-TOF MS, which allows for the mass determination of biomolecules by ionization and vaporization without degradation, as well as the use of a Laser beam to ionize the sample, has reduced these issues.

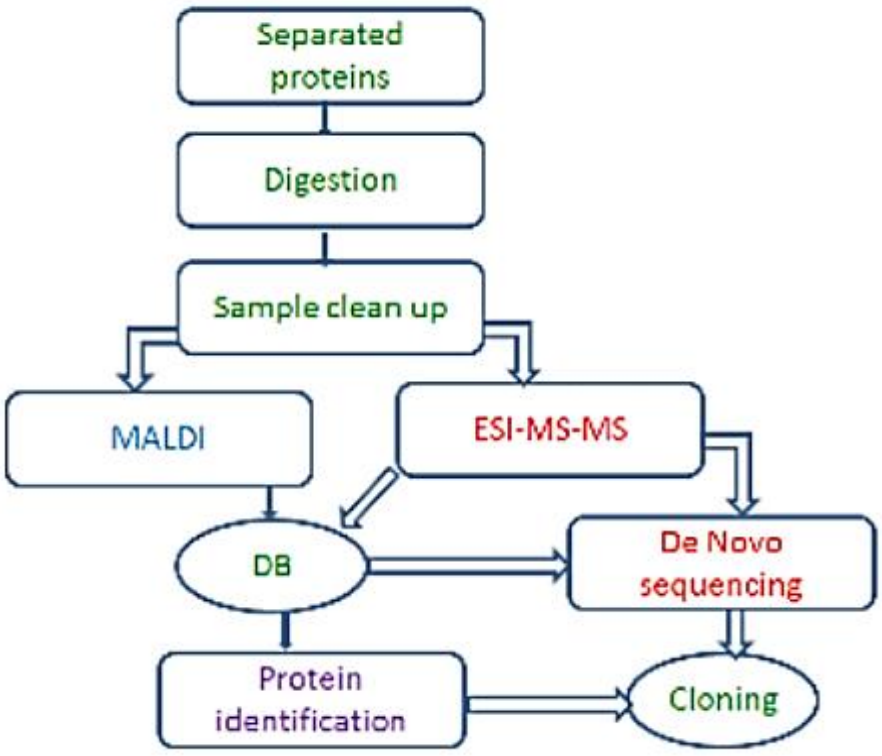

Figure 2: Representation of Matrix Assisted Laser Desorption/Ionisation (MALDI) analysis method[8]**.**

Peptide maps have been generated from protein samples that have been analyzed by HPLC or SDS PAGE. These peptide maps have been used to determine the purity of a known protein in a known sample or as fingerprints for proteins. When proteins are digested by proteolytic enzymes like trypsin, mass spectrometry creates a peptide map. This peptide map may be used to search a sequence database for a suitable match in the database that already exists.

1.2.5 Sample Preparation:

Biomolecules such as proteins, peptides, and polymers of organic substances are characterized by MALDI-TOF MS. The process of sample preparation for MALDI-TOF is both fascinating and crucial. Prior to MALDI-TOF analysis, purify the protein sample since it is more tolerant of sample contaminants, but contaminants may severely disrupt sample molecules' integration with developing matrix crystals. In a 1:2 ratio, the sample and matrix may be mixed. Different kinds of matrices are employed depending on the sample, some of which are 2-dimensional (4-hydroxy phenylazo benzoic acid, 2, 4, 6-trihydroxyacetophenone, 3-aminoquinolone, cinnamic acid, etc.). The protein sample is combined with matrix on a metal plate and MALDI-TOF analysis is performed using the dried droplet method. The matrices were combined to provide somewhat better results16. Standard metal plates should be utilized in small quantities. Hydrophilic sample anchors, on the other hand, are effective in generating small spots.

1.2.6 Matrix:

A good matrix should have the following characteristics: it should be able to absorb UV wavelengths of about 237 nm, be readily evacuated, and be able to transmit proton to sample molecules. The matrix's main function is to absorb energy from laser pulses and then transmit that energy to the sample, which may cause the material to vaporize. Typical MALDI matrix for protein samples consists of hydroxylated benzoic acid and cinnamic acid derivatives.

1.3 ADVANCED METHODS IN PROTEOMICS:

1.3.1 Isotope-Coded Affinity Tags (ICAT):

It is a quantitative proteomics technique that does not need the use of gels and depends on chemical labeling reagents. These chemical probes are made up of three main components: a specified amino acid side chain, an isotopically coded linker, and a tag for affinity separation of labeled proteins and peptides. For a quantitative comparison of two proteomes, one sample was labeled with isotopically light isotopes, while the other was labeled with isotopically heavy isotopes. Both samples were tagged using isotope-coded reagents. LC-MS is used to examine these peptides. Deuterium, 13C 18, was used as a tag. The method primarily relied on the relative measurement of proteins in two or more biological samples. The extra technique in ICAT- Visible tag is visible isotope-coded affinity tags, which enable the electrophoresis location of tagged peptides to be readily observed.

1.3.2 Isobaric Tags for Relative and Absolute Quantification (iTRAQ):

It is also a non-gel-based method for quantifying proteins called isobaric tags for relative and absolute quantification (iTRAQ). In proteomics, iTRAQ is used to investigate quantitative changes in the proteome19. 4-plex and 8-plex are chemicals that may be used to label all peptides from various samples based on covalent labeling of the N-terminus and side chain amines of peptides from protein digestions with tags of variable mass. Mass spectrometry MS/MS may be used to analyze the samples. For analyzing MS/MS spectra, several kinds of software are available.

1.3.3 Absolute Quantification (Aqua):

AQUA is a research group that looks at the absolute quantification of proteins and their modifications. Synthetic proteins may be prepared via covalent alterations. These changes are chemically similar to posttranslational modifications that occur spontaneously. These peptides are utilized in tandem mass spectrometers to measure post-translationally changed proteins following proteolysis.

1.3.4 ESI-Q-IT-MS:

The resolution of the Micro electrospray ionization (ESI)-Quadrupole ion trap (QIT) Time of Flight (TOF) mass spectrometer (MS) is excellent. Proteins are ionised in solution and have various charge states in ESI ionisation. Because proteins have a high charge state, their m/z measurements are usually less than 2000, and the TOF detector has extremely excellent mass accuracy in this scan range, utilizing ESI-QTOF analysis for protein mass determination offers a number of advantages. In ESI-QTOF, this results in more precise mass measurements for proteins.

1.3.5 SELDI-TOF-MS:

Surface-enhanced laser desorption/ionization (SELDI) is a mass spectrometry ionization technique that is used to analyze protein mixtures. SELDI is most often used with time-of-flight mass spectrometers to identify proteins in clinical samples; it may also be used to compare protein levels with and without illness to find biomarkers.

2. LITERATURE REVIEW

Bystrom C et al. discussed Proteomics in which they explained how Background Clinical proteomics has historically referred to studies that use technologies to quantify the abundance of hundreds or thousands of proteins in a single sample to try to find new biomarkers for illness diagnosis, prognosis, or therapeutic treatment. These studies started with protein electrophoresis, namely two-dimensional (2D) gel electrophoresis, and have progressed to processes that largely depend on mass spectrometry (MS). Clinical labs have developed quantitative assays for proteins in human samples using the processes established for discovery proteomics, which address many of the problems associated with protein quantification by immunoassay. Clinical research is evolving, and protein measures used in patient treatment are about to change dramatically. Content this chapter starts with an overview of clinical proteomics, with a focus on serum and plasma protein 2D gel electrophoresis. It then goes on to discuss MS-based discovery methods, such as data-dependent and data-independent acquisition. It concludes with a review of bottom-up and top-down targeted quantitative proteomic techniques as alternatives to immunoassays and Western blotting. Peptide selection, denaturation and digestion, peptide and protein enrichment, internal standards, and calibration are all given special consideration[6].

Kempenaers B et al. discussed Proteomics in behavioral ecology in which they explained how Proteomics is the study of a genome's protein complement with the goal of comprehending protein production, regulation, function, and relationships. Without prior knowledge of the nature of these molecules, expression proteomics provides an unbiased picture of the proteins possibly linked with or accountable for particular actions. Recent developments in mass spectrometry, bioinformatics, and genome sequencing have made proteomics accessible to non-model species research in a variety of scientific areas. n this review, we draw behavioral ecologists' attention to proteomic technologies and highlight the tremendous potential they provide for interdisciplinary research by highlighting the benefits of large-scale protein studies, suggesting research topics best addressed by this approach, and highlighting some of the techniques available for the identification and quantification of prokaryotes. We also demonstrate how proteomic methods may aid in the formulation and testing of ideas about the processes underlying behavior, as well as the development of experimental instruments that allow for behavior modification[9].

Sweetman G et al. discussed Quantitative mass spectrometry in proteomic in which they explained how one of the most essential, but also most difficult, technical challenges in proteomics is quantifying differences between two or more physiological states of a biological system. Mass-spectrometry-based quantification techniques have grown in popularity during the

last five years, in addition to the traditional methods of differential protein gel or blot staining by dyes and fluorophores. The majority of these techniques use differential stable isotope labeling to produce a unique mass tag that can be detected by a mass spectrometer while also serving as a foundation for measurement[10].

3. DISCUSSION

The study of proteins and their interactions in a cell is known as proteomics. With the completion of the Human Genome Project, the focus is turning to the human organism's protein complement. Proteomics is anticipated to provide improved disease indicators for diagnosis and treatment monitoring since it more precisely represents the dynamic state of a cell, tissue, or organism. Proteomics technologies, which allow for the worldwide identification and quantification of proteins, have opened up new possibilities and difficulties for those trying to better understand illnesses. To discover molecular markers of illnesses based on protein pathways and signaling cascades, high-throughput proteomics methods combined with sophisticated bioinformatics are widely utilized. Mass spectrometry is an essential technique for molecular and cellular biology and plays an important role in proteomics. While there is a lot of promise, there are still a lot of problems to overcome, such as mining low abundant proteins and integrating proteomics with genomes and metabolomics data. Proteomics, on the other hand, provides the basis for building and retrieving valuable information for biomedical research. A glimpse of current problems in proteomics technology is addressed in this study.

4. CONCLUSION

Proteomics has made a lot of progress in recent years. The technologies are quick, sensitive, and cover a larger portion of the proteome. Purification, analysis, characterisation, quantification, sequence and structural analysis, and bioinformatics analysis of a huge number of proteins in all kinds of eukaryotic and prokaryotic organisms have all been successful using a combination of these methods. The increased usage of proteomics methods has benefitted all areas connected to biological sciences. However, further research is needed to enhance the repeatability and efficacy of well-known proteomics techniques.

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AN ANALYSIS OF PROBIOTICS

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ABSTRACT

More than a century has passed since Tissier discovered that rods with a bifid shape bifidobacteria dominated the gut microbiota of healthy breast-fed babies, but were missing from formula-fed children suffering from diarrhoea, establishing the theory that they played a role in preserving health. Since then, a number of studies have backed up this claim, although they were initially poorly planned and controlled, and they encountered practical difficulties such as strain specificity of characteristics and probiotics' sluggish growth on substrates other than human milk.Probiotic bacteria have grown in popularity over the past two decades as a consequence of mounting scientific data demonstrating their positive effects on human health. As a consequence, they've been used in a variety of goods, with the food sector playing a key role in researching and marketing them. Probiotics have been used in a variety of goods, mostly fermented dairy foods, in this market. Given this tendency, and despite solid scientific evidence linking these microbes to a variety of health advantages, further study is required to establish them and assess their safety as well as nutritional elements. The aim of this article is to examine the existing research on the idea of probiotic bacteria and their potential beneficial qualities, with an emphasis on those found in food.

KEYWORDS:*Diarrhoea, Health, Lactose, Prebiotics, Probiotics.*

1. INTRODUCTION

The link between probiotics and health has a long history. They have successfully developed through time, with the most recent ones amassing more significant proof that probiotic bacteria may benefit human health[1]. These findings, along with rising consumer knowledge of the link between health and nutrition, have created an enabling climate for the creation of the functional food concept, which describes foods or food components that offer health benefits beyond their nutritional worth. The functional food industry is growing, particularly in Japan, its origin, with additional possibilities in Europe and the United States, and probiotics account for the majority of its goods in most countries. Improvement of intestinal health, alleviation of lactose intolerance symptoms, and decrease of the risk of different illnesses have all been reported as benefits of probiotic intake, and many well-characterized Lactobacilli and Bifidobacteria strains are available for human use . Despite the encouraging findings, the significance of probiotics in

human health, as well as the safety of their use, should be studied further, since our understanding of the qualities required for their functioning in the gut is incomplete[2].

1.1 Probiotics:

The name probiotic is derived from the Greek word probioticos, which means "life." However, the definition of probiotics has changed through time in tandem with the growing interest in the use of live bacterial supplements and advances in understanding their mechanisms of action. The term was first used to describe substances produced by one microorganism that stimulated the growth of others, but it was later expanded to include tissue extracts that stimulated microbial growth and animal feed supplements that benefit animals by contributing to the balance of their intestinal flora. Until recently, Fuller's definition was the most commonly used, and it helped to shape the probiotic idea in many ways: "probiotics are live microbial feed additives that benefit the host animal by enhancing microbial balance. The current definition is provided by the Food and Agriculture Organization of the United Nations World Health Organization, which defines probiotics as "live bacteria that bestow a health benefit on the host when supplied in sufficient quantities." In the context of food, the term may be tweaked to emphasize that microbes have a positive effect "when eaten in sufficient quantities as part of food[3].

Gibson and Rober- froid used the term prebiotics in 1995 to characterize dietary supplements that are nondigestible by the host but may have positive effects by selectively stimulating the development or activity of microorganisms in the gut. Prebiotic compounds are not 642nfavourab or absorbed in the gastrointestinal system, but they may be utilized as probiotic substrates, with nondigestible fructo-oligosaccharides being the most frequently used at the moment. Certain writers have referred to the combination of probiotics and prebiotics as conbiotics, while others have referred to it as symbiotics. Although prebiotics seem to have a function in health promotion, further research is needed to confirm this. In recent years, the term "functional food" has been used to describe foods that include components that provide health benefits in addition to their nutritional worth. Probiotics, for example, are examples of goods that include biologically active components that enhance health[4].

1.2 Microbial Species with Applications as Probiotics:

Taking their definition into account, the number of microbial species that may have probiotic characteristics is staggering.Only strains categorized as lactic acid bacteria are relevant in terms of nutrition, and among them, those belonging to the genera Lactococcus and Bifidobacterium have the most significant characteristics in a practical setting. Lactic acid bacteria are Gram-positive, catalase-negative bacteria that ferment carbohydrates to generate lactic acid as the primary end-product. Because they utilize a different metabolic route, the species Bifidobacterium is usually not phylogenetically classified among them. Streptococcus 642nfavourable and Lactococcuslactis, two of the most economically significant lactic acid bacteria, are two additional species that play a major role in the food business, especially dairy products, while not technically being called probiotics[5].

It's worth noting that, since probiotic actions are strain-dependent, strain identification is necessary to determine their eligibility and efficacy for industrial use. This is accomplished via a mix of phenotypic testing followed by molecular methods such as DNA/DNA hybridization, 16SRNA sequencing, and so on.

1.3 Desirable Probiotic Properties:

A prospective probiotic strain is anticipated to possess certain desired characteristics in order to exercise its positive effects. The ones currently determined by in vitro tests are I acid and bile tolerance, which appears to be crucial for oral administration, adhesion to mucosal and epithelial surfaces, an important property for successful immune modulation, competitive exclusion of

pathogens, and prevention of pathogen adhesion and colonisation,antimicrobial activity against pathogenic bacteria, antimicrobial activity against pathogenic bacteria, antimicrobial activity against path. Nonetheless, the significance of these metrics is still debatable due to issues of relevance, in vivo and in vitro differences, and a lack of uniformity of operating procedures. Because no one criterion is required for all probiotic uses, the best way to determine a strain's characteristics is to conduct research on a particular population and physiologic function[6].

The probiotic dosage levels in the final product should be based on those shown to be effective in human trials, and the colony forming units per gram of product is an essential metric. Although information on minimum effective concentrations is still lacking, it is widely accepted that probiotic products should contain at least 106 CFU/Ml or gram of probiotic microorganisms and that a total of 108 to 109 probiotic microorganisms should be consumed daily for the probiotic effect to be transferred to the consumer. Furthermore, the strains must be capable of growing in both manufacturing and commercial environments, as well as retaining viability under typical storage conditions. Viability is a requirement for probiotic activity since it enhances processes including adherence, gut permeability reduction, and immunomodulation, and it poses an industrial difficulty. However, other research have shown that viability is not required for all probiotic effects, since not all pathways or clinical advantages are directly linked to viability, and that even cell wall components on certain probiotic bacteria or probiotic DNA may have important health effects. Thus, for certain probiotic strains, excellent growth during the early manufacturing stages may be sufficient, and they may not need high storage viability[7].

1.4 Mechanisms of Probiotic Activity:

Probiotics have a variety of modes of action, but the precise mechanism by which they exert their effects is yet unknown. These include bacteriocin and short-chain fatty acid synthesis, gut Ph reduction, nutritional competition, and mucosal barrier function stimulation and immunomodulation. Probiotics affect many elements of the acquired and innate immune response by promoting phagocytosis and IgA production, changing T-cell responses, increasing Th1 responses, and attenuating Th2 responses, according to several studies.

1.5 Probiotics and Food Products:

Probiotic strains are found in a broad variety of food items, which is continuously expanding. The most popular dairy products on the market include fermented milks, cheese, ice cream, buttermilk, milk powder, and yogurts, with the latter accounting for the majority of sales.

As an appropriate method of probiotic administration to the customer, nondairy food applications include soy-based products, nutrition bars, cereals, and a range of juices. Aside from safety, the compatibility of the product with the microbe and the preservation of its viability during food processing, packaging, and storage conditions are also variables to consider when assessing the effectiveness of including probiotic strains into such goods. The Ph of a food, for example, influences the survival and development of the integrated probiotic, which is one of the reasons why soft cheeses seem to have a variety of benefits over yoghurt as delivery methods for viable probiotics to the gastrointestinal tract. Current technical developments provide new methods to solve probiotic stability and viability problems, opening up new possibilities for their integration into new media and, as a result, meeting rising consumer demand. Microencapsulation technologies have been created to shield microorganisms from the effects of the outside world. Beverage producers may now offer a dry version of the probiotic bacteria to consumers thanks to the development of a straw delivery method. Furthermore, live spores of a spore-forming probiotic are available on the market, which provide processing benefits. Simultaneously, the potential of bifidobacteria to produce lantibiotics (antimicrobial compounds) is being investigated for use in the food industry.

1.6 Hea1th Benefits of Probiotics:

Probiotics' claims of beneficial effects, such as improved gut health, improved immunological response, lower blood cholesterol, and cancer prevention, are gaining traction. These health properties are strain-specific and are influenced by the aforementioned mechanisms. While some of the health advantages have been well proven, others need further research to be confirmed. In fact, substantial evidence supports probiotic use in the treatment of acute diarrhoeal diseases, the prevention of antibiotic-associated diarrhoea, and the improvement of lactose metabolism, but insufficient evidence supports their use in other clinical conditions.

1.7 Antibiotic-Associated Diarrhoea:

Diarrhoea, mild or severe, is a frequent side effect of antibiotic treatment because the natural microbiota is inhibited, allowing opportunistic or pathogenic strains to thrive. Diarrhoea without mucosal abnormalities to pseudomembranous colitis are all possible symptoms. The latter is a severe kind of antibiotic-associated diarrhoea (produced by Clostridium difficile, which may produce lethal strains following antibiotic usage). The term comes from the plaque-like adherence of fibrinopurulent material to the injured mucosal layer, and it is characterized by diarrhoea, abdominal distention, vomiting, fever, and 644nfavourable, as well as consequences including toxic megacolon and perforation if left untreated. The treatment comprises of discontinuing the causative antibiotic, correcting electrolyte imbalances, and, in extreme instances, metronidazole or vancomycin therapy. Treatment using probiotics, such as L. rhamnosus and S. boulardii, has been utilized in clinical practice. Probiotic usage has been linked to a lower incidence of antibiotic-associated diarrhoea in many trials. Probiotic supplementation (specifically, L. rhamnosus, L. casei, and the yeast S. boulardii, since these are the probiotics most often included in the majority of studies) is linked with a decreased risk of antibiotic-induced diarrhoea, according to a recent meta-analysis. The optimum dosage of probiotic preparation and the comparative effectiveness of different probiotic treatments are topics for future study.

1.8 Infectious Diarrhoea:

Probiotic bacteria are perhaps best known for their use in the treatment and prevention of infectious diarrhoea. Rotavirus is the world's most frequent cause of acute infantile diarrhoea and a leading cause of newborn death. The virus replicates in the highly differentiated absorptive columnar cells of the small intestinal epithelium, and the normal microflora seems to play a key role in the host response to infection, since antigen absorption in germ-free mice is much higher than in normal animals. Probiotic addition of baby foods has been used to prevent rotavirus infections as well as to treat existing illness. Probiotics such as L. rhamnosus GG, L. reuteri, L. casei Shirota, and B. animalis Bb12 have been demonstrated in well-controlled clinical trials to reduce the duration of acute rotavirus diarrhoea, with the greatest evidence pointing to the effectiveness of L. rhamnosus GG and B. animalis Bb12. Competitive blockade of receptor site signals regulating secretory and motility 644nfavour, amplification of the immune response, and creation of chemicals that directly inactivate virus particles are among the suggested methods. There is evidence that some food and 644nfavour probiotic strains may limit the development and adherence of a variety of diarrhoeal disorders, in addition to rotavirus infection. Probiotics such as Lactobacillus reuteri, Lactobacillus rhamnosus GG, Lactobacillus casei, and S. boulardii have been shown to reduce the duration of acute diarrhoea in children. In a prospective, randomized, controlled French trial of children in day care, for example, the given probiotic yoghurt product containing L. casei substantially reduced the mean duration of diarrhoea compared to the traditional one [40]. Probiotics have been studied in the prevention of travellers' diarrhoea in adults in a number of trials. Despite the fact that findings are inconsistent owing to differences in research demographics, types of probiotics examined, dosages used, as well as trip

destination and 645nfavoura compliance, L. rhamnosus GG, S. boulardii, L. acidophilus, and B. bifidum seem to be effective. Furthermore, many animal studies have shown that probiotics have an inhibitory effect on enteropathogens, mostly via the formation of bacteriocins.

1.9 Lactose Intolerance:

Lactose intolerance is caused by a genetically programmed lack of beta-galactosidase, which prevents lactose from being infavourable into the monosaccharides glucose and galactose. When undigested lactose reaches the big intestine, bacterial enzymes breakdown it, causing osmotic diarrhoea. Beta-galactosidase deficiency may be acquired and is generally reversible. Other reasons include pelvic radiation, which destroys the mucosa, rotavirus infection, which infects lactase-producing cells, and short bowel syndrome. After consuming milk or milk products, lactose intolerant people experience diarrhoea, stomach discomfort, and flatulence. Although conventional yoghurt preparations containing S. infavourable and L. delbrueckii ssp. Bulgaricus are more effective in this regard, partly due to higher beta-galactosidase activity, lactose metabolism improvement is a claimed health benefit attributed to probiotics, and it appears to involve specific strains more than others and in specific concentrations. As a result, and since some people have reacted well to probiotic supplementation, doctors should explore it as a treatment option.

1.10 Probiotics and Allergy:

Recent research indicates that early life exposure to bacteria may protect against allergies, and in this case, probiotics may offer a safe alternative to microbial stimulation for babies' growing immune systems. At the same time, they enhance mucosal barrier function, which is thought to aid in the modulation of allergic responses. The importance of intestinal microbiota in allergy is confirmed by findings of quantitative and qualitative differences between children and babies with allergies and healthy children and infants, with the former showing colonization by a more adult-like type of microflora. Food allergies and atopic dermatitis seem to be especially affected by probiotic effects. The latter is a common chronic relapsing skin disease of children, with genetic predisposition as well as the individual's exposure to environmental allergens playing a role in its etiology. Only a few strains have been evaluated for their efficacy in the treatment and prevention of newborn allergy. B. lactis and L. rhamnosus GG were shown to be effective in reducing the severity of atopic eczema in a recent trial of breast-fed babies with atopic eczema. Furthermore, when given prenatally to women who had at least one first-degree relative with atopic eczema, allergic rhinitis, or asthma, L. rhamnosus GG was shown to be effective in avoiding the development of atopic eczema in high-risk babies. Probiotics, on the other hand, haven't proven particularly effective in reducing asthma symptoms. Food allergy is defined as an immunologically mediated 645 nfavourable response to dietary antigens, which results in subsequent intestinal inflammation and disruptions. The mechanisms of L. rhamnosus GG's immune modulating effect are unknown, although they seem to be linked to antigen transport through the intestinal mucosa. Probiotic preparations have recently been examined in people with milk hypersensitivity (not lactose intolerance), with the conclusion that some strains may reduce the milk-induced inflammatory response and ameliorate allergy symptoms; nevertheless, further research is needed in this area.

1.11 Other Health Benefits:

The list of health advantages mediated by probiotics is not limited to the ones described so far, but also contains a number of potential effects that need to be confirmed in human research. Probiotic bacteria are dietary components that may have a role in cancer prevention, according to research. Although the exact mechanisms are still being researched, studies have shown that certain Lactobacillus and Bifidobacterium spp. Reduce the levels of carcinogenetic enzymes produced by colonic flora by normalizing intestinal permeability and microflora balance, as well

as producing antimutagenic organic acids and enhancing the host's immune system. Furthermore, research indicates that probiotic bacteria-containing foods may help prevent coronary heart disease by lowering serum cholesterol levels and improving blood pressure management. Interference with cholesterol absorption from the stomach, direct cholesterol assimilation, and the formation of end fermentation products that affect systemic levels of blood lipids and mediate an antihypertensive effect are among the proposed processes. Nonetheless, these probiotic effects are still up for dispute, since further long-term human trials are required. Finally, probiotic strains found in dairy products have been demonstrated to enhance the treatment result in women with bacterial vaginosis, most likely by assisting the normal vaginal lactobacilli microbiota.

2. LITERATURE REVIEW

CastañedaGuillot C et al. discussed probiotics in aquaculture. The goal of this research is to provide complete information on the use of probiotics in aquaculture. Probiotics have been shown to aid in the growth, survival, and health of aquatic animals. In aquaculture, intestines, gills, aquatic animals' skin mucous, ecosystems, and even culture collections and commercial goods may be used to get suitable probiotics, which have been identified as bacteria (Gram-positive and Gram-negative) and nonbacterial species (bacteriophages, microalgae and yeasts). While a bacterium may be a disease to one aquatic animal, it may be beneficial to another; the screening procedure is important in determining which probiotic species to use. Probiotics are administered in a variety of ways, from the oral/water regimen to feed additives, the latter of which is widely employed in aquaculture. Probiotics may be used in single or multiple strains, as well as in conjunction with prebiotics, immunostimulants such synbiotics and synbiotism, and in both living and dead forms. To provide probiotics to aquatic animals, encapsulating probiotics with live feed is a viable option. Dosage and timing are important variables in achieving the intended outcomes. Probiotics have a variety of effects, some of which are well known and others that aren't[8].

Snydman D et al. discussed Risk and safety of probiotics in which they explained how for years, probiotics have been used safely. In published clinical studies, safety results are reported in a variety of ways. Although existing probiotic clinical trials show no indication of increased risk, the Agency for Healthcare Research and Quality stated in 2011 that "the present research is not well prepared to address concerns on the safety of probiotics in intervention studies with confidence." Critics argue that the overwhelming body of evidence, which includes a long history of safe probiotic usage, data from clinical trials, and animal and in vitro research, all support the premise that probiotics are usually safe for most people. Systemic infections, detrimental metabolic activities, excessive immunological activation in vulnerable people, gene transfer, and gastrointestinal side effects are among the theoretical hazards reported in case reports, clinical trial findings, and experimental models[9].

Balakrishnan K et al. discussed beneficial properties of probiotics in which they explained how Probiotics are living bacteria found in fermented foods and cultured milk, and are often utilized in baby meal preparation. They're known as "healthy bacteria" because they have a variety of health benefits, including preventing bowel illnesses, boosting the immune system, treating lactose intolerance and restoring gut microbial balance, alleviating menopause problems, and decreasing traveler's diarrhoea. Recent research has focused on their application in the treatment of skin and oral disorders. Furthermore, probiotics have been proposed as a new treatment option for anxiety and depression by modulating the gut-brain axis[10].

3. DISCUSSION

The human gut is home to a diverse population of microorganisms, mostly bacteria, that may have both negative and positive impacts on human health. The variety, composition, and stability

of the intestinal microbiota help to maintain intestinal homeostasis in healthy people. Changes in the human intestinal microbiota caused by lifestyle or dietary changes, as well as antibiotic exposure, may have a role in the development of metabolic illnesses and disorders. Because ingested bacteria may transiently integrate into the gut microbiome, probiotic intake has been suggested as a way to reduce these disruptions. Probiotics are living bacteria that, when eaten in appropriate quantities, help to maintain the gut microbiota's balance and stability. Several strains of Lactobacillus and Bifidobacterium are the most often utilized probiotics. This paper discusses several aspects of Probiotics.

4. CONCLUSION

There is scientific data that suggests including probiotics into one's diet may provide health advantages. When it comes to the prevention and treatment of some diseases, this data seems sufficient, but when it comes to others, it appears promising or even contentious. Bowel problems such as lactose intolerance, antibiotic-associated diarrhoea and infectious diarrhoea, and allergies are among the most well-documented effects, and new data is accumulating on their possible involvement in a variety of other illnesses. Such products are becoming more popular at the same time as relevant consumer knowledge is growing, and they tend to constitute one of the biggest functional food markets. Dairy products, especially yoghurt, remain the most significant vehicles for delivering probiotic bacteria to consumers, with the nondairy industry developing as well as a consequence of advancements in food technology and rising demand. As the variety of new goods with enhanced sensory appeal expands, customer acceptability grows, and the food sector spends more in this expanding market by developing new methods and products, creating a virtuous cycle. Nonetheless, probiotics for human use are still in their early stages of research. More study, in the form of controlled human trials, is required to identify which probiotics and doses are most effective for particular patients, as well as to show their safety and limits. Furthermore, probiotics' regulatory position as food components must be defined on an international level, with a focus on efficacy, safety, and the validation of health claims on food labels. There is no doubt that the role of probiotics in nutrition and medicine will grow significantly over the next decade, and while their use in the prevention and treatment of various disorders should be considered by medical professionals and promoted by the food industry, it should be done with caution and respect for the consumer.

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INNOVATIVE METHODS OF TEACHING DESCRIPTIVE GEOMETRY IN HIGHER EDUCATION

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ABSTRACT

Drawing geometry is a branch of geometry in which spatial figures consisting of points, lines, and the sum of surfaces are studied in terms of their flat images or projections. The main function of graphic geometry is to align a three-dimensional object with its flat projection model. Innovative methods of teaching descriptive geometry in higher education require modernization.

KEYWORDS:*Higher Professional Education, Professional Competence, Methodological Support, Descriptive Geometry and Engineering Graphics.*

INTRODUCTION

Recently, the leadership of our government has highlighted four key areas for further development of higher education. One of them is the abandonment of paperwork and the introduction of digital technologies. Training of technical specialists requires the transmission of large amounts of graphic data (drawings) over long distances. When it comes to descriptive geometry, diagrams should be sent in both directions: from student to teacher, and from student to student, pointing out shortcomings. The use of the remote method involves the dynamic exchange of information using computer networks instead of ordinary mail messages. In this regard, the problem of abandoning the study of paper engineering graphics and transferring project documents to computer media is a priority.

In this case, transferring graphic files prepared in AutoCAD on a computer is no problem, only the educational standards do not provide for the transfer of all images to the plane of computer graphics only. The basis of graphic geometry is the study of geometric figures in orthogonal projections, i.e. the properties of spatial shapes are studied directly from the drawing itself. In other words, the student has a flat image of the object being studied, not the originals. This is the greatest difficulty of the science under consideration. Thus, descriptive geometry serves as a theoretical basis for a drawing course, and a closely related course is based on knowledge of the basics of elementary geometry (planimetry and stereometry), so great attention is paid to these definitions and theorems of elementary geometry later used in descriptive geometry. should be

given. In this case, in particular, it is necessary to dwell on the method of geometric locations of points and lines.

Students should first be taught to solve problems in space, that is, to model a task with the power of spatial imagination. All the elements of the problem are in place, that is, only after the student sees his task in space, it will be possible to proceed to the representation of it in the plane using the methods of descriptive geometry. Particular attention is paid to the ability to correctly analyze the initial data of the problem, because the process of correct execution of the problem depends on the correctness of these analyzes.

The main guide for practical training in descriptive geometry is the "Workbook". It should be designed in a concise way so that students can implement the solutions directly in the workbook and do not spend extra time re-drawing the graphic state of the task. It also eliminates the possibility of making the wrong decision because the graphic situation is distorted during redrawing**.**

LITERATURE REVIEW

The use of specially designed models and real technical details, as well as the demonstration of Flash animations will give good results in mastering the course. It is advisable to use animation technology in the preparation of electronic guidelines. However, experience has shown that over-indulgence in models weakens independent spatial thinking [1]. It is advisable to use models only when students have problems. Each subject, including descriptive geometry, must develop an educational concept that affirms the essence of the subject and helps to identify approaches and teaching methods. While the method of teaching a topic is based on general didactics, this methodology represents a necessary source of didactics. There is an existing connection between didactics and methodology as there is between general and specific things. One of the main tasks of didactics is to reflect as deeply as possible the experience and generalizations existing in the methodology of teaching in these individual disciplines.

The methodology of higher education combines the scientific and educational bases, while the educational bases are always based on the scientific basis. Teaching methods are based on scientific content and methods. The scientific method allows us to evaluate what is possible and what is not possible in science. The methodological aspect of lecture teaching is based on the creative use of teaching theory. One of the main pedagogical requirements is that each lesson should be interesting and the listeners should have a deep understanding of the essence of the topic. Based on the goals and objectives of teaching, teaching methods can be considered as the construction of a didactic system and its activities to solve specific educational problems.

RESEARCH METHODOLOGY

Drawing geometry tasks range from simple learning tasks to identifying and solving original, design-practical problems. Problem-based learning requires students to do independent creative research.

For a long time, there were training systems that provided training materials and test assignments in the form of texts and images. Data in such systems has a linear or tree-like structure, modern systems use hypertext and multimedia tools, and remote work with the student is provided. Several e-learning manuals on descriptive geometry have been reviewed. The difference between them is mainly the location of the subjects and the quality of the pictorial material. We can mention the work [1] in which the problem of increasing visibility is posed and simple and effective imaging tools for solving problems of descriptive geometry are proposed. Later, systems emerged that allowed the solution to be performed graphically on a computer screen, in response to which the student would have to show one or more points of the drawing.

Also noteworthy is the e-learning system [3], which provides a comprehensive approach to the teaching of computer drawing and geometric modeling, and provides an interactive study of two-dimensional and spatial structures. Even in systems known as the Monge method of plane construction, objects of corresponding size are not formed.

The use of a training system that allows you to build drawings on the Monge apparatus and at the same time create three-dimensional images of objects and see the results in axonometry gives good results. The system can be used for user-controlled operation as well as in training mode. To create lessons, a special language is used that describes geometric shapes and the actions in them. Lessons can be formatted using a text editor as well as in user memorization mode. In this case, each process performed on the objects is related to one or more sentences of the language mentioned above. The introduction of computer technology in the educational process is of particular importance today. Human development is determined by the level of development of its productive forces and, above all, by the human intellect, certain requirements are placed on its formation, adequate perception and processing of information in a concentrated and time-limited environment, professional competence [4, 6].

ANALYSIS AND DISCUSSION OF RESULTS

The purpose of graphics training is to develop skills in elementary geometric devices, work in a graphic editor, geometric graphics, analysis of oral and visual information, projection graphics, and increase productivity in the creation of technical documentation [5] on machine graphics is to have the initial skills. In recent years, there has been a steady decline in the volume of sciences that develop spatial perception. The formation of geometric thinking should begin at a much younger age. There is inconsistency in the reform of primary, secondary and higher vocational education. As a result, it is felt that spatial perceptions are not developed among the students of the first two stages.

CONCLUSIONS AND SUGGESTIONS

The formation of spatial imagination skills begins with the study of elements of geometry, descriptive geometry, engineering, and computer graphics. The organizational principles of traditional teaching of spatial imagination are based on a relatively large workload. This approach justifies itself, but the regular reduction in the amount of time devoted to science leads to a significant decrease in the level of preparation.

The high rate of development of computer-aided design methods and tools has created an urgent need to study the pedagogical aspects of geometric modeling.

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LESSON QUALITY INDICATORS

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ABSTRACT

This article discusses one of the most pressing issues in the education system, namely the content of the lesson and the competencies that determine the quality of teaching.In addition, guidelines and recommendations have been developed for teachers to pay attention to the structure of the lesson, what is relevant to its content in the process of preparation for the lesson.

KEYWORDS:*Course, Competence, Scientific, Media, Didactic Materials, Attention, Course Stages.*

INTRODUCTION

One of the thinkers said of a lesson, "A good lesson for an hour is a great work."The student's knowledge, interest in science, ability to work with text, maps, tables, tools, as well as the teacher's knowledge of the materials in the curriculum, the ability to distinguish key ideas on the topic given to students in the process of explaining the topic, sequence, consistency, exhibition, skills and abilities to follow the principles of harmony of theory and practice, to pay attention to the plan in determining the purpose of the subject, to monitor and evaluate students 'knowledge in accordance with the requirements of the Regulations on monitoring and evaluation of students' knowledge in higher education institutions, to use time effectively during the lesson,

As shown above in the process of preparing a lesson If the competencies that determine the quality of the course are systematically applied, it is possible to increase the quality of teaching, to increase students' interest in science education.

Without knowing the essence of the concept of the lesson, talking about the lesson is "like a person bathing in a river without water." For this reason, we considered it appropriate to dwell in detail on the nature of the lesson below.

In some literatures, a lesson is defined as a form of teaching based on the material taught to students in order to acquire knowledge, skills, competencies, worldviews and ethical-aesthetic

ideas, while in others it is defined as a completed part of the educational process in terms of time and organization.

It is known that in the educational process solves the functions aimed at the goals of education and development.

Processes that cannot be accomplished in the classroom, in counseling, and in independent assignments, that is, in meeting the requirements of the curriculum and syllabus, in achieving the development of students' knowledge and outlook, take place only in the classroom.

The concept of lesson planning was first introduced to the science of pedagogy by the German scientist F. Herbort entered.

Lesson plan- is a brief description of the lesson, which reflects the topic of the lesson, its purpose, its course and forms of monitoring and evaluation of students' knowledge.

The concept of a lesson plan is introduced to a future teacher for the first time in a higher education institution while studying subjects such as "General Pedagogy" and "Teaching Methods".

We will focus on the following components of the lesson plan.

- expression of the subject of the lesson;

- the purpose of the lesson;

- eaching aids;

- the course of the lesson;

- homework description.

Lesson topic. The teacher gives students a brief and clear annotation about the lesson topic. The topic of the course should be relevant to the syllabus, which is not only indicated for reporting to the administration of the educational institution, but also is announced to students at the beginning of the lesson and is often written on the board before the lesson begins or indicated in the presentation of the lesson topic. Therefore, the subject of the lesson in the curriculum should be able to formulate the whole essence of the lesson, clearly and very briefly.

The methodological sciences have defined that the lesson will consist of three main

- Objectives.

- Educational;

- Educational;

- Developer;

Thus, the educational purpose of the lesson is the content of knowledge, skills and competencies that are formed and strengthened in the minds of students.

For educational purposes - the teacher should indicate the educational value of the study material being studied.

The developmental goal is to include facts, events, and the ability to critically evaluate and compare them to help students develop logical thinking.

It is known that when a teacher comes to class unprepared, he cannot fully convey the purpose of the lesson to students; uses interactive methods ineffectively; does not ensure active participation and independent work of students in the lesson; questions asked to reinforce a lesson or to assess

students' knowledge are not structured in a problematic way. As a result, the effectiveness of the course decreases, and the quality of teaching does not improve .Therefore, the preparation of the lesson in accordance with its structure is one of the important competency-based approaches to improving the quality of teaching in the educational process.

Therefore, below we will think about what it is important for the teacher to focus on in the process of preparing the lesson according to its structure.

In determining the purpose of the lesson - It is important to take into account the specifics of the topic, the level of competence of students in the study of the subject, the place of the topic among the topics, the purposeful expression of the topic, the delivery of the goal to students.

When creating a lesson plan -the lesson plan should be mapped to the set goal, the plans should be in a logical sequence and interconnected, the time should be allocated for the plan items, and the forms of teaching should not be left out.

In covering the course content -The content of the course should meet the requirements of the State Educational Standard, the topics should be reliable, complete, understandable, the scientific content of the material should be educational and career-oriented, the formation of new concepts to overcome difficulties in acquiring new knowledge.

In the methodology of teaching -the level of students' mastery of the subject materials is directly related to the methods used by the teacher. It is known that classes in higher education institutions are conducted in the form of lectures, practical classes, laboratory work, seminars. The teacher has a high level of speaking culture in the classroom; it is important to be able to use visual aids effectively, to work with diagrams or tables with laboratory equipment at a high level, and to have the skills and competencies.

The effectiveness of the methodology used in the course is determined by the extent to which students have mastered the subject materials.

To do this, the teacher must: make the right choice of methods, tools and techniques of teaching; correctly define the purpose of the lesson; at each stage of the lesson, apply the methods correctly; diversity of methods and techniques used; effective use of modern pedagogical and information technologies, visual aids, handouts and didactic materials; adherence to criteria for monitoring and evaluation of students' knowledge, skills and abilities.

In the teacher's communication with students – Given the importance of students' discipline and adherence to academic activities, the teacher should review the general preparation of the classroom, constantly monitor the attention and activity of students, their interest in science.

It is important to have a high level of pedagogical ethics, to speak in a clear, understandable language, to be able to create a good psychological environment in the classroom and to express only those ideas that are relevant to the topic of the lesson.

In assessing students' knowledge –Teachers must adhere to the quality of knowledge, skills and competencies acquired by students; solid and in-depth knowledge;

In the scientific nature of the subject -the teacher has a deep knowledge of the subject on a scientific basis, as well as the ability to accurately state scientific rules and definitions and to inculcate scientific terms in the minds of students; to take into account the specifics of education in the classroom; to enrich the textbook topics with additional literature; The laboratory, which is carried out by the student, should pay attention to the expediency of practical and independent work in the scientific direction, the connection of education in the process of describing a new topic.

In the didactics of the course:

1. The content of the lesson should be clearly stated and consistently reach the minds of students.
2. Conformity of the stated ideas to the principles of education.
3. The course should consist of developmental and problem-based learning.
4. The appropriateness of the use of visual aids, handouts, didactic materials and ICT in the presentation of the topic in the classroom.
5. The need to conduct experiments, laboratory and practical work with a clear goal.
6. Correctly focus on working with textbooks and additional literature and ensure that the issues are consistent with theory and practice.
7. Examples and issues related to theory and practice.
8. Attention to the fact that the lesson is conducted in a certain system leads to the solution of the quality indicator.

In general, in accordance with the above ideas, rules, instructions, recommendations, competencies, lesson preparation - the improvement of the quality of students' knowledge, the development of skills and competencies, imposes a responsibility on the teaching profession.

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AN ANALYSIS OF OPTICAL FIBRE COMMUNICATION

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ABSTRACT

Recently, optical fiber communication technology has advanced significantly, with continuous exploration of new technologies substantially enhancing communications capabilities in the conventional sense, resulting in the use of optical fiber communication technology in a wider context. Because optical communication system deployment is expensive and reconfiguration is often difficult or uneconomical, system experimentation and simulation have become necessary to anticipate and optimize system performance. This paper is about communication via optical fibers. High-bandwidth transmission can handle large quantities of data, which may be further enhanced by lowering fiber losses, increasing data rates and distances, and developing optical sources and detectors that are compatible with fibres. The article also discusses current developments in the field of fiber optic communication, as well as advancements in various fiber types and their characteristics, optical sources, detectors, system limits, and applications.

KEYWORDS: *Data, Information, Light Emitting Diode (Led), Opticalfibercommunication.*

1. INTRODUCTION

Fiber optics communication is a method of transmitting information such as data, video, and speech that is modulated with a pulse of light that acts as an electromagnetic carrier wave and is sent down a glass tube over a long distance with very little attenuation or loss. The concept of complete internal reflection is used to transmit this modulated pulse of light through the glass tube (TIR). A fiber channel, also known as a fiber optics communication link, is a technology that offers a point-to-point data connection between two locations. It includes a data transmitter with a laser diode or Light Emitting Diode (LED) that converts an electric signal to light, a transmission fiber through which the modulated light travels, and a receiver with a photo detector that converts light to an electric signal. Fiber optics were not widely accessible until 1970, when Corning Glass Works was able to manufacture a fiber with a 20dB/km loss. The attenuation of today's optical fibers varies from 0.5dB/km to 1000dB/km, depending on the optical fiber utilized. Since the first commercial installation of a fiber-optic system in 1977, the applications of optical fiber communications have grown at a fast pace. Optical fiber connections were first used by telephone companies to replace their outdated copper wire networks. Optical fiber is used by today's telephone companies as the backbone architecture and as the long-

distance link between municipal phone systems.Fiber optics are also being integrated into cable television networks by cable providers. Optical fiber has mostly replaced the trunk lines that link central offices[1].

1.1 Importance of Optical Fiber:

Fiber optics are a flexible conduit that can transport information in the same way that a copper wire can transmit electricity. They are used to light tiny things. Copper, on the other hand, only transmits a few million electrical pulses per second, while an optical fiber can carry up to 20 billion light pulses per second. This implies that phone, cable, and computer companies can manage massive data transfers at the same time, much more than traditional lines can handle. Because of the tremendous growth in data volume over the last 20 years, fiber optic cable was created. The current Internet and World Wide Web would not be feasible without fiber optic cable[2].

1.2 Advantages Of Optical Fiber Communication[3]:

- **Extremely High Bandwidth***:*Fiber provides more bandwidth than any other cable-based data transmission method.
- **Expanding Bandwidth Is Simple:**With many current versions of fiber optic cabling, additional equipment may be connected to the existing fiber line to offer significantly increased capacity over the initially placed fiber. Dense Wavelength Division Multiplexing, or DWDM, allows fiber optic cable to switch on and off different wavelengths of light traveling down the fiber at will. Fiber cable's two features allow dynamic network capacity allocation to accommodate data traffic surges and lulls.
- **Resistance to Electromagnetic Interference:**Because fiber is extremely resistant to electromagnetic interference, it has a very low rate of bit error. The transfer of data via fiber optics is practically noise-free.
- **Early Detection Of Cable Damage And Secure Transmissions:**Unlike traditional, electron-based transmissions, fiber provides an extremely secure transmission medium because there is no way to detect the data being transmitted by “listening in” to the electromagnetic energy “leaking” through the cable. Splices in the cable may be readily identified by continuously monitoring an optical network and precisely measuring the time it takes light to reflect down the fiber.
- High frequency signals transmitted via conventional coaxial cable lose half their strength after just a few hundred meters, while optical fibers lose the same amount of power after 15 kilometers or more. At extremely long distances, a repeater will be needed.
- Optical fiber has a transmission capacity of 10 GB/sec, while coaxial cable has a rate of 1 GB/sec.
- It has a lot of benefits over copper wires during installation because of its tiny size, low weight, and high flexibility.
- Because fiber optics have no electrical conductivity, no grounding or shielding is required.

- Electromagnetic interference sensitivity, such as when a telephone line loses part of its signal to another.
- Because fiber does not lose any light, the transmission is also secure and unaffected.
- The fiber is devoid of electrical impulses, thus it cannot shock or cause other dangers. This makes fibers acceptable for use in potentially explosive environments.
- It's simple to set up and compatible with digital technologies.
- The cable's lightness and compact size allow it to transport a high quantity of signals.

1.3 Disadvantages Of Fiber Optics[4]:

- **Fiber Optic Cabling Installation Prices Are Still Expensive:**Despite the fact that fiber installation costs are decreasing by as much as 60% per year, fiber optic cable installation costs are still high. Fiber is extending beyond its initial domain and primary use in the carrier backbone, going into the local loop and allowing subscriber and end user broadband access via technologies such as F Fiber to the Home, Premises, and PONs (Passive Optical Networks).
- **Special Test Equipment Is Often Needed:**Test equipment designed for classical electron-based networking is ineffective in a fiber optic network. In order to effectively test optical fiber, equipment such as an OTDR (Optical Time Domain Reflect meter) is necessary, as well as costly; specialist optical test equipment such as optical probes at most fiber endpoints and connection nexuses.
- **Physical Damage Susceptibility:**Fiber is a tiny and compact wire that is prone to being cut or damaged during installation or building operations. Railroad car derailments represent a major cable damage danger since railways often provide rights-of-way for fiber optic installation, and these incidents may interrupt service to huge groups of people because fiber optic cables can give enormous data transfer capabilities. As a result, when fiber optic cable is selected as the transmission medium, restoration, backup, and survival must all be considered[5].
- **Wildlife Damage To Fiber Optic Cables:** Many birds, for example, find the Kevlar reinforcement substance of fiber cable jackets especially attractive as nesting material, so they nibble at them to get a piece of it. Beavers and other rodents chew on exposed fiber optic cable to sharpen their teeth, while insects like ants want the plastic covering in their diet, thus they're often seen nibbling on it. Sharks have been known to chew on fiber optic cable when it is installed underwater, particularly at the repeating spots, causing damage. A plant known as the Christmas tree plant treats fiber optic cable like a tree root, wrapping itself around it so tightly that light impulses traveling down the fiber are suffocated.
- *Cost:* Despite the fact that sand, the raw material used to make optical fibers, is plentiful and inexpensive, optical fibers are nevertheless more costly per metre than copper. Although a single fiber can transport much more signals than a single copper cable, the long transmission lengths necessitate the use of fewer and more costly repeaters.
- **Fragility:** Optical fibers are more susceptible to breakage than electrical cables.

- **Chemically Influenced:**The glass may be influenced by a variety of substances, including hydrogen gas (a problem in underwater cables.)
- **Opaqueness:** Despite widespread military usage, most fibers are known to turn opaque when exposed to radiation.
- **Requires Specialized Expertise:**Optical fiber cannot be connected as simply as copper wire, necessitating extra staff training as well as costly precision splicing and measuring equipment.
- Care should be taken while connecting fiber optic cables since if the connection is incorrect, a lot of attenuation will result in a long wave length.
- Because fiber optics has no electrical conductivity, the power supply to the repeaters is provided via copper wire rather than optical fiber.
- In comparison to other kinds of T/N lines, the installation cost is extremely expensive.

1.4 Applications Of Fiber Optics[6]:

Optical fibers' popularity is growing, and so are their applications and practical usage. Fiber optic cables have grown in popularity across a wide range of industries and applications.

1.4.1 Communications / Data Storage:

Fiber optics has made major advancements in the area of communications due to its resistance to electrical noise. The use of light as a data transmission medium has enhanced voice communication sound quality. It's also utilized for sending and receiving information.

1.4.2 Military:

Optical technologies provide more security than conventional metal-based systems. Magnetic interference enables information to leak via coaxial wires. Because fiber optics is impervious to electrical interference, it is ideal for military and communications applications where signal quality and data transfer security are critical. Because of the military's increasing interest in this technology, stronger fibers, specifically engineered cables, and high-quality components have been developed. It was also used in a wide range of applications, including seismic and sonar hydrophones, airplanes, submarines, and other underwater applications.

1.4.3 Medical:

Fiber optics are utilized as surgical lasers, light guides, and imaging instruments. Fiber optic cable is also used in endoscopes, which are diagnostic instruments that allow users to look through tiny holes in the body. For minimally invasive surgical operations, medical endoscopes are utilized. Bronchoscopes (for the lungs) and laparoscopes both utilize fiber optics. Endoscopes are all designed to appear like a long thin tube with a lens or camera at one end, through which light is emitted from a bundle of optical fibers tied together within the enclosure.

1.4.4 Mechanical or Industrial:

Industrial endoscopes also known as bore scopes or fiberscopes, allow the user to examine places that are difficult to access or view under normal conditions, such as jet engine interiors, mechanical welds in pipes and engines, space shuttles and rockets, and sewage lines and pipes.

1.4.5 Networking:

In a number of network setups, fiber optics is utilized to link servers and consumers. It improves data transmission speed, quality, and accuracy. The increased transmission of digital data via optical fibers has advanced computer and Internet technologies.

1.4.6 Industrial/Commercial:

Fiber optics is utilized for imaging in difficult-to-reach locations. It's also utilized in wiring when there's an issue with electromagnetic interference (EMI). It is often used as a sensory device to detect temperature, pressure, and other variables, as well as in the wiring of automobiles and industrial environments.

1.4.7 Spectroscopy:

Optical fiber bundles are used to transport light from a spectrometer to a material that cannot be put within the spectrometer so that its composition may be determined. By bouncing light off and through substances, a spectrometer can analyze them. A spectrometer may examine things that are too big to fit within, as well as gases and reactions that occur in pressure vessels, by utilizing optical fibers[7].

1.4.8 Broadcast/CATV /Cable Television:

Fiber optic cables are used by broadcast and cable providers to connect CATV, HDTV, the internet, video, and other applications. Fiber optic cable was first used in the cable television business in 1976, and its usage rapidly expanded due to its superiority over conventional coaxial wire. Fiber optic systems have become more affordable and capable of delivering crisper signals from a greater distance away from the source signal. It also cut down on signal losses and the number of amplifiers needed for each client. Because just one optical line is required for every 500 homes, fiber optic cable enables cable companies to deliver better service.

1.4.9 Lighting and Imaging:

Fiber optic cables are employed as sensors to detect and monitor a wide variety of factors, as well as for lighting and images. It's also utilized in medical, technical, and industrial research, development, and testing. In medical and other applications where strong light must beam on a target without a clear "line-of-sight route," fiber optics is utilized as light guides. Optical fibers are employed in certain buildings to carry sunlight from the roof to other sections of the structure. Decorative uses for optical fiber lighting include signage, art, and artificial Christmas trees. The light-transmitting concrete building product LiTraCon, which is a transparent concrete building material, requires optical fiber.

2. LITERATURE REVIEW

Arumugam M et al. discussed Optical fiber communication in which the article examines the evolution of optical communication technologies through time, as well as its early failures. The various generations of optical fiber communication, as well as their characteristics, are then examined. Total internal reflection is discussed, as well as various kinds of fibers and their sizes and refractive index profiles, dispersion, and loss processes. Finally, the overall optical fiber communication system is briefly discussed, along with its benefits and drawbacks. Future optical fiber communication based on soliton is also emphasized[8].

Satish Addanki et al. discussed optical fibers in which they discussed how Optical fibers may be used in light transmission applications since they are waveguides. The core of the optical fiber is surrounded by a glass or plastic layer termed cladding, which has a lower refractive index than the core. For the fine confinement of light inside the waveguide, the total internal reflection phenomenon is required. Optical fibers are classified primarily by their structure, number of modes, refractive index profile, dispersion, data processing capability, and polarization. The first three main kinds of optical fibers are the subject of this study. Fiber lasers may be used to produce and magnify a narrow concentrated beam of coherent and monochromatic light, which is a typical use of the fibers. The preform formation is one of three steps in the fabrication of optical fiber. The modified chemical vapor deposition (MCVD) method is a well-known method for fabricating optical fibers. Optical fiber sensors are widely used in optics and photonics for a variety of purposes. Optical biosensors based on refractive index shifts, which are extensively utilized for detecting biomolecules in their natural forms, may be produced as a sensing application[9].

Singh K discussed Optical Fibre Communication in which he discussed how Recently, optical fiber communication technology has advanced significantly, with continuous exploration of new technologies substantially enhancing communications capabilities in the conventional sense, resulting in the use of optical fiber communication technology in a wider context. Because optical communication system deployment is expensive and reconfiguration is often difficult or uneconomical, system experimentation and simulation have become essential for predicting and optimizing system performance. The topic of this article is optical fiber communication. High-bandwidth transmission can handle large quantities of data, which may be further enhanced by lowering fiber losses, increasing data rates and distances, and developing optical sources and detectors that are compatible with fibres. The article also discusses current developments in the field of fiber optic communication, as well as advancements in various fiber kinds and their characteristics, optical sources, detectors, system limits, and applications[10].

3. DISCUSSION

This article gives an overview of the most recent research and development in the area of fiber optic communication systems. In the past decade, there have been significant advancements in the area of optical fiber communication. Wide-bandwidth signal transmission with low latency is becoming more important in a variety of applications, including future exaflop-scale supercomputer development, finance algorithmic trading, and cloud computing. Optical fibres offer unrivaled transmission capacity, and they are currently the transmission medium of choice in telecommunications networks for long-distance and high-bit-rate transmission.

The primary goal of this article is to provide an overview of recent fiber optic communication research and development. Fiber optics is a critical component of the telecommunications infrastructure. It is suitable for gigabit transmission and beyond because to its high bandwidth capacity and low attenuation properties. The many kinds of fiber and their uses, light sources and detectors, couplers, splitters, wavelength-division multiplexers, and state-of-the-art technologies utilized in the most recent high-bandwidth communication systems have all been discussed. Because fiber-optic biosensors can be easily miniaturized and integrated for the determination of different target compounds in a wide variety of application fields, such as industrial process and environmental monitoring, food processing, and clinical applications, they will play a significant

role in the development of biosensors. Various fiber optic applications that have recently been created have been addressed. The fiber optics business has grown at a breakneck pace during the last five years. According to analysts, this sector will continue to expand at a rapid pace far into the next decade and beyond.

4. CONCLUSION

Optical fiber communications have transformed our lives in many ways over the past four decades, and low-loss optical transmission fibers have been essential to optical communications technology's tremendous success. Low-loss optical transmission fibers have unquestionably contributed to the tremendous success of optical communications technology. The so-called passive optical network was suggested for the already-envisioned fiber-to-the-home (FTTH) network in the telecommunications industry. The usage of passive optical splitters was extensively used in this network. Standard single-mode fibers were used to make these splitters (SMFs). Despite the fact that FTTH would not become widely available until decades later, research into the usage of components in telecommunications applications persisted. Optical fiber communications were transformed when the fiber optic amplifier became commercially available in the early 1990s. Optical signals might reach hundreds of kilometers without regeneration if they were amplified [1]. The signal-to-noise ratio (SNR) of the received signal and the available bandwidth are the two factors that ultimately restrict the performance of any communication system. The notion of channel capacity, developed within the context of information theory, may be used to express this restriction more explicitly.

Traditional copper wires twistedpair cable or coaxial cable have been replaced by fiber optic technology, which is a significant technical advancement. As we progress in the Information Technology era, the burden of transferring massive quantities of data must rest on this new technology's shoulders. There is no denying the enormous possibilities that fiber optic technology offers, and it should be continually studied and developed to meet future needs.

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AN ANALYSIS OF HUMANOID ROBOT

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ABSTRACT

Exoskeleton technology has gone a long way since its inception in the late 1960s, thanks to advances in robotics. Exoskeleton designs have been created by researchers all over the globe, and some of the most well-known exoskeletons include the BLEEX, MIT exoskeleton, HAL, LOPES, ALEX, and many more. Although technology has progressed since the 1960s, there are still difficulties in exoskeleton design. In this research, we'll look at various exoskeleton technologies and their applications in rehabilitation. Based on a plethora of studies, this goal in rehabilitation seems to be promising.Humanoid robots, inspired by human looks and talents have become indispensable in human civilization in order to enhance people's quality of life. Many researchers have worked on humanoid robots to improve their capabilities all around the globe. Humanoid robot systems, in general, comprise decision-making and information-processing processes. Fuzzy sets are most frequently employed because of the uncertainty involved in decision-making and information processing. This research looks at a thorough literature analysis on humanoid robots that covers current technical advancements as well as ideas regarding fuzzy set models. The fundamental ideas and notions of fuzzy sets are given for humanoid robots.

KEYWORDS:*Exoskeleton, Human, Humanoid Robot, Sensors, Technology.*

1. INTRODUCTION

A humanoid robot is a programmed machine that can mimic human behaviours as well as appearance. A humanoid robot has two primary functions: the capacity to get information from its environment and the ability to perform physical tasks like moving or manipulating things. After years of research and development, the existing humanoid robots currently come in a variety of sizes, weights, and heights, all of which are linked to their intended use. Humanoid robots, in general, behave like humans, moving their eyes and lips to convey emotion. They also have hands and legs, allowing them to do a variety of human-like activities, as well as the capacity to learn new things via the use of sensors and other technologies like as artificial intelligence. In a nutshell, a humanoid robot is one that is equipped with sensors to detect its surroundings and effectors to carry out an action[1].

1.1 Architecture of Robot:

A humanoid robot is a machine that looks and acts like a person. A humanoid robot should have the appearance and behavior of a person. With the development of technology, the look and characteristics of humanoid robots are becoming more and more human-like. The technology being developed to make the humanoid robot appear like a person in terms of facial expressive robot head, robot hand, robot mobility, and robot learning behavior is discussed in the following subsections[2].

1.1.1 Facially expressive robot head:

Humanoid robot research focuses on the interaction between humans and robots. The capacity to communicate is always the most essential aspect of a humanoid robot's ability to behave like a person. We constantly communicate to one other via facial expressions, arm and hand movements, voice, and other body language in our everyday human-to-human contact. These acts are simple for humans to do and have been practiced from infancy. When it comes to human-robot communication, we want the robot to do what we do. As a result, some researchers began developing a humanoid robot capable of imitating human behavior.

The capacity to convey emotions in the face is one of the most significant characteristics of humans. Expression defines a person's personal characteristic and enhances communication efficiency in everyday human conversation. We've always hoped to be able to converse with robots in a human-like manner. As a result, face expressive robotic head systems, such as Character Robot Face (CRF), have been created by researchers. WE3RV, a human-like head robot, was created in Japan. Human emotions like pleasure and rage are defined and programmed into the robot. When the robot detects external stimuli using sensors, the data is translated, and the robot expresses emotion by moving the various elements of the face, such as the eyebrows, ears, eyelids, lips, and mouth, in a human-like manner. For example, a robot named Kismet was created in Cambridge and is capable of performing a range of proto-social reactions utilizing CCD camera technology and displaying human-like emotions[3].

The greatest problem is that a humanoid robot's expression coverage is insufficient. For example, human pleasure may be split into many distinct levels, each of which has its own expression, and the technology of human-like head robots is progressing to the point where the expression coverage will be comparable to human. Gazing is an essential part of human-to-human communication. A speaker uses it to communicate with his or her audience as a gaze pattern that may convey the speaker's mood. Eye contact is a rude or dominating indication where individuals will stare at each other in order to show respect while conversing. As a result, researchers are considering including the capacity to gaze in the robot. For Honda's humanoid robot, ASIMO, for example, the researcher developed a gaze and gesture algorithm. As a result, the ASIMO can look at humans and make hand movements, and it is regarded as a story-telling robot. A humanoid robot's gaze control entails detecting fixation points and coordinating head-eye motions. As the eyes of the humanoid robot, a camera is utilized. The robot's head will move in response to the identified item[4].

1.1.2 Robot hand:

The hand is one of the most essential organs in a human's everyday activities. Humans cannot easily accomplish tasks without the use of their hands. This is also used to a humanoid robot, resulting in a humanoid robot with hands. The human hand is a complicated mechanism whose performance and characteristics are difficult to duplicate. The weight, size, minimum number of fingers, necessary degrees of freedom (df) of the fingers, and others are key features of an artificial hand that mimics a human hand for a humanoid robot. The anthropomorphic artificial hand has been developed based on the key features that provide the fundamental function to the

hand, which is typically powered by DC motors. Fingers on a human hand may execute a variety of functions. Humans have been given the ability to manipulate their fingers since they were born. However, for a humanoid robot, executing the action in order to carry out duties such as stably pinching paper or needle with finger tips is very challenging. For high-performance remote manipulation, a robot with four fingers, each with three degrees of freedom, has been created. The manipulation method, on the other hand, is still in the early stages of development. In Japan, researchers created a robot hand that can pinch up paper. The terminal fingers now have more degrees of freedom of independent motion, while the thumb now has more degrees of freedom of twisting motion[5].

1.1.3 Robot Locomotion:

Walking by legs is simple for a human. However, adding it to a humanoid robot is a difficult job. Bipedal locomotion technique is used by today's humanoid robots. In the area of bipedal walking, there are now two methods, one of which is the Zero-Moment-Point hypothesis (ZMP). The location on the ground where the net moment of the inertial and gravitational forces has no component along the axes parallel to the ground is known as the ZMP. ZMP's trajectory is crucial in keeping the robots balanced when walking. The ZMP trajectory must be inside the supporting polygon specified by the position and forms of the supporting feet for a viable walking pattern. Asimo from Honda and the WABIAN bipedal humanoid robot created in Japan are only two examples of humanoid robots that use ZMP-based control. QRIO, a humanoid robot created in Japan, is another example. It is capable of sprinting and leaping in addition to walking. To accomplish steady run and leap, the researchers utilized the ZMP stability criteria. It showed that using this technology, the humanoid robot's movements is more human-like. The passive dynamic walking technique, which McGeer pioneered, is another option. Without the use of motors or controls, the humanoid robot can walk down a hill. The robot's energy efficiency is greater when this technique is used. The foot contact sensors make it simple to operate. However, owing to the round feet employed, this technology has certain limitations, such as the inability to stay still, the difficulty to start or stop walking, and the inability to alter the pace and direction. As a result, certain enhancements have been made, such as the addition of actuators to walking robots and the installation of direct drive or elastic actuators at parts of the biped's joints[6].

1.1.4 Robot Learning Behavior:

Face expressions and hand movements are used by a humanoid robot to interact with humans. It can even carry objects and travel from one location to another using its hand. However, in our everyday activities, all of these capabilities are insufficient; the humanoid robot must be able to modify current capabilities, deal with changes, and rapidly acquire new talents. Some methods, such as imitation learning, may be used on the humanoid robot to meet the criterion. When a third party shows a move, imitation learning involves instantly repeating it and storing it in memory. The external motion capture system, which is based on specific sensors, is used for humanoid robots. There are indicators that are used to detect movement. It may be difficult for a humanoid robot to mimic human behaviors at times. Some human movements, for example, cannot be replicated by the robot owing to joint angle restrictions, dynamic constraints, or a lack of joints. Another comparable approach is referred to as "programming by demonstration." This method enables the robot to watch a person doing a task. The material from the demonstration is then extracted and mapped into an abstract[7].

Reinforcement learning is another technique that improves the learning behavior of humanoid robots. A humanoid robot may use this technique to enhance its performance on sequential decision-making tasks. The robot's behavior will be enhanced as a result of this approach, since the time-consuming step-by-step programming will be removed. Several techniques, such as

reinforcement learning using Decision Trees, have been included into this methodology. During model learning, this approach will be aggressively generalized, reducing the number of trials needed for learning. Many research have used a discrete low-dimensional state space to perform reinforcement learning tasks. However, in order to operate the humanoid robot smoothly, a continuous high-dimensional state space should be used. In order to overcome the issue, the researcher developed the Allocation/Elimination Gaussian Soft max Basis Function Network (AE-GSBFN) technique for adaptive allocation[8].

1.2 Applications:

Humanoid robot development progresses on a regular basis. Previously, humanoid robots were primarily employed in domestic settings and for amusement. However, because to technological advancements, the humanoid robot may now be used in a variety of areas, including healthcare, sports, space exploration, construction and manufacturing, and even education. The following sections go through the many uses of humanoid robots in various areas.

1.2.1 Home applications:

In this day and age, individuals are preoccupied with their jobs and often leave their homes empty. As a result, they need a robot to care after their home while they are away. As a result, Japanese researchers created a system that allows people to operate one or more humanoid robots in their homes remotely using a mobile phone or the internet. This aids users in perceiving the circumstances at the robot's location. While the home is vacant, users may pre-define certain places in the house and delegate specific activities to the robot, allowing the humanoid robot to go to those spots and do chores depending on the user's requirements

1.2.2 Entertainment:

Humanoid robots are becoming more popular as entertainment devices. Humanoid robots communicate well with humans through facial expressions, hand gestures, and other body languages. Many humanoid robots are now being created for entertainment purposes. SDR-4X, a tiny humanoid robot, is one of the examples. It is capable of walking on an uneven surface and avoiding obstacles while walking in a real-world home setting. The dynamic and fluid dancing of the SDR-4X performance is composed using a program called SDR Motion Creator. Dancing and A Cappella Chorus performances are two of SDR-4X's major capabilities. SDR-4X can also learn and recognize the user's faces and names, as well as communicate with them using a synthetic voice.

1.2.3 Healthcare:

Humanoid robots have human-like characteristics, such as the ability to walk on two legs and interact with humans. Humanoid robots may be employed as service robots in hospitals to aid nurses and patients with their tasks, as well as to enable individuals in distant locations interact with those in the hospital. Humanoid robots have become the nurse's avatar in hospitals since they can speak and comprehend the patient's wants. For patients, a humanoid robot assists those who are unable to move. The patient may also converse with the robot and consider it as an additional user. One of the most common developmental diseases is autism. Many children with autism may struggle with everyday tasks such as communication, social engagement, and imaginative play. Robots may be utilized as a therapeutic aid in this case. There are two kinds of humanoid robots that have been specifically designed to assist youngsters with autism. IROMEC and KASPAR are the two humanoid robots. IROMEC is a mobile robotic platform featuring a cartoon-like figure as its interface. KASPAR is a humanoid robot with a tiny size. Both humanoid robots teach social interaction and communication skills to youngsters with autism.

1.2.4 Sport:

Sport is another significant human activity. As a result, experts are looking into the potential of a humanoid robot participating in sports. In the Robocup soccer tournament, fast and flexible walking is an essential requirement for a humanoid robot. The primary difficulty in doing so is the insecurity. To address this issue, the researcher developed a novel fuzzy-logic control system that allows the robot to walk quickly and easily while maintaining high turning stability. This may be accomplished via incline walking and carefully adjusting the step length. A fuzzy algorithm is used to determine the correct angle of the joint, allowing the robot to respond appropriately to different body circumstances. EFuRIO, a humanoid robot, was created for this purpose. The current version (third generation) is capable of standing, walking, turning, and kicking.

1.2.5 Construction And Industry:

It is critical to replace people with humanoid robots for hazardous work on the construction site. Construction machinery and equipment, for example, play an essential part in a variety of activities on the job site. Humans are often exposed to hazards when working machinery and equipment. If a humanoid robot can operate machinery and equipment while being controlled from a distant location, the issue of hazardous occupations will be solved. In a disaster scene, when a construction equipment is needed to take away some large and heavy items, a humanoid robot also performs an essential role. Working at a disaster scene is hazardous for a human operator. HRP-1 is a humanoid robot that was created in Japan by researchers. It uses tele-operation to use the proxy drives of construction equipment like a lift truck. This humanoid robot can be controlled by a command received from a remote computer. The humanoid robot's ability to handle and carry large items is limited. The majority of humanoid robots can only land at the position of their end-effectors. If the humanoid robot can make random contacts with the environment, it will be able to handle and carry larger items. As a result, the researcher suggested a technique called "full body contact motion." The contact status is controlled by the controller's distributed tactile sensors. The humanoid robot can now lift a 30 kg box using haptic input thanks to this technology.

1.2.6 Education:

In addition to the aforementioned uses, several researchers have begun to focus on education. Robotis, a Korean robot company, has created a humanoid robot named Bioloid. Bioloid is a hobbyist and educational robot kit designed to function as a teaching assistant and offer students with an interactive learning environment. In addition, the researcher suggested an IDML tool for instructors to use to create instructional materials and design the movements of the humanoid robot. Furthermore, IDML technologies offer a platform for students to engage with a humanoid robot and participate in learning activities. Bioloid, the educational robot, has a positive impact on kids and is able to hold their attention in class.

2. LITERATURE REVIEW

Sasaki K et al. discussed Repeatable Folding Task by Humanoid Robot Worker Using Deep Learning in which the suggested method collects data in an understandable manner and has the following features: task performing capacity, task reiteration ability, generalizability, and ease of application. The suggested method employs a real-time user interface with a monitor and a head-mounted display to give a first-person view. Teleoperation is utilized via this interface to gather task operating data, particularly for activities that are difficult to do using traditional methods. The suggested method also employs a two-phase deep learning model. A fully connected deep time delay neural network learns the dynamics of a robot task process from the extracted picture features and motion angle data, and a deep convolutional autoencoder recovers and reconstructs

images. The suggested model is evaluated using the 'Nextage Open' humanoid robot as an experimental platform. To evaluate the item folding task, 35 trained and 5 untrained sensory motor sequences were used. The object folding task is completed with a success rate of 77.8% when the trained model is tested using online generation[2].

Ogawa K et al. discussed Honda humanoid robots development in which The study began with the first prototype two-legged robot walking straight and still. The newest humanoid robot ASIMO has now accomplished a seamless transition from walking in a straight line to turning. ASIMO is Honda's most sophisticated robot in terms of mechanism and control system to date. The configuration of ASIMO enables it to function freely in human living spaces. With its five-finger arms and walking abilities, it may be of practical use to humans. The goal of ASIMO's future development is to create a robot that will enhance human civilization[9].

Khoramshahi M et al. discussed Humanoid robots versus humans in which they explained howHumanoid robots playing a therapeutic role in assisting people with social problems like autism is a novel area that has yet to be investigated in schizophrenia. We wanted to see how schizophrenia patients identify positive and negative facial expressions exhibited by a humanoid robot since the capacity for robots to communicate emotion seems to be crucial for human-robot interactions. There were 21 schizophrenia outpatients and 17 healthy people in the study. They were given pictures of human faces and a humanoid robot (iCub) exhibiting positive or negative emotions, as well as a non-social stimulus, in a response time test. The symptomatology, mental perception, response speed, and number of correct answers of the patients were all assessed. The results showed that patients and controls identified the emotional valence of human facial expressions better and quicker than the robot[10].

3. DISCUSSION

The researchers have achieved an amazing outcome after many years of study on humanoid robots. The researchers' contribution to the world's tremendous achievement ranges from a robot that only performed task-by-task setup by humans to a robot that can speak with humans, from a robot with just a gripper and roller to move and do work to a robot with hands and legs that are human-like. But, regardless of how much money is spent on research and development or how quickly technology advances, when will humanoid robots be commonplace in society? This is a huge problem that the whole globe is dealing with. However, this will not deter continued development into humanoid robots, and it is expected that they will become commonplace in the future. However, it is unclear how long the procedure will take. Humanoid robots are anticipated to have improved perceptual abilities in the future. To cope with the uncertainties of sensory signals, more sophisticated techniques will be created. The capacity of a humanoid robot to converse with humans will increase as computer vision and voice recognition technologies develop. Muscle-like actuators will be used in the mechanical components for safe operation of humanoid robots in close proximity to humans. The movement of the humanoid robot's hand, particularly the finger, will become smoother, similar to that of a human hand. Furthermore, humanoid robots will have a wider range of uses. For example, the development of an underwater humanoid robot may replace humans who suffer mobility and respiratory issues while venturing further into the sea . All of the aforementioned problems will be future research challenges for scholars.

4. CONCLUSION

With its capacity to gather information from its surroundings and perform physical tasks similar to humans, humanoid robots are a fascinating area of research. The basic idea of a humanoid robot is to collect information using various types of sensors and then execute various tasks based on that information utilizing the face expressive head, hands, torso, and legs. The research

of humanoid robots has been going on for almost four decades, and new technologies are being developed all the time to replace or improve previous ones. Many studies are influenced by science fiction films and programs such as "Star Wars," "Real Steel," and "Transformers." Humanoid robots that have recently been created are coming closer and closer to mimicking human behavior. The ASIMO by Honda, an astronaut-like robot, the HRP-4 by Kawada, a thin, quick, and sophisticated robot created by the Japanese government, and Nao by Aldebaran, one of the prettiest and most intelligent robots, are just a few of the popular humanoid robots. These humanoid robots are all behaving humanoid.

The current methods and technologies utilized by researchers, such as human-robot communication, hand and ocomotion systems, and learning behavior technology, have all been described and explored in this paper. In the past, humanoid robots were created for show rather than for a specific function or application. Humanoid robots have begun to be used in a variety of areas as technology has advanced in recent years, as described in this research. All of the created robots, however, are still in the research phase and will not be used in the actual world. The humanoid robot's future trend and difficulties are addressed. Humanoid robots will provide us with a higher quality and more pleasant existence if the difficulties stated can be overcome.

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A BRIEF REVIEW ON THE SMART HOME AUTOMATION WITHTHE SOLAR DETECTOR

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ABSTRACT

Everything is getting more mechanized as a result of technological advancements. With advancements in automation technology, a user's or anybody else's life is becoming easier in every way. Because automated systems are easier to use, everyone prefers them over manually run ones. The internet of things is abbreviated as IOT. This research study is divided into two sections. The solar panel on the roof and the motion detection light switching system in the room are the first two components. A stepper motor is used to drive the solar panel, which is controlled by a microprocessor. To absorb the most energy, the solar panel will constantly face the sum at a perpendicular angle. A signal may be transmitted from here to the room light switching system to turn on or off the light based on the quantity of solar radiation present outside, or by monitoring the stepper motor angle, i.e. sending a signal when the angle exceeds a certain degree. The second part consists of a PIR (passive infrared) sensor that detects motion in a room and is controlled by a microcontroller; when it detects human presence in the room, it will turn on the light; when it detects no human presence in the room, it will turn off the light after a threshold time limit. The time restriction may be anything between 10 and 20 minutes, depending on your instincts.

KEYWORDS:*Automated, Controller, Electronic, Electrical, Embedded System, Energy, Home, And InternetOf Thing, Office, And Wireless.*

INTRODUCTION

A solar panel is a collection that allows a payload to be oriented toward the Sun. Solar panels, parabola troughs, Fresnel mirrors, lenses, and heliostat mirrors are common payloads. Devices are used in flat-panel solar systems to reduce the angle of incidence of sunlight as well as a photovoltaic panel, also known as the cosine error. When this angle is reduced, the quantity of energy generated from a given amount of fixed power generation capacity rises. Trackers were expected to be utilized in at least 85 percent of commercial installations larger than one megawatt from 2009 to 2012 in conventional solar applications in 2008-2009.

Home automation refers to working at home and its applications via the internet; the internet of things, meanwhile, has a wide range of uses and applications in engineering disciplines such as electrical, electronics, and computer science. Home automation is also becoming more useful in many ways, and this is good in use because of its safety and security. Home automation and controllers have expanded the area of home automation[1].

Home automation has also progressed and become more helpful in a variety of areas and aspects since it aids in the monitoring and control of all home appliances according to the needs of the user. Home automation systems have evolved into energy-efficient and user-friendly smart home technologies. Automation has also been utilized in offices for the same reason, as well as for accurate and real-time data on work and workers[2].

There are many characteristics in home automation that distinguish it from other technologies. For example, it has fundamental functions to preserve the user's pleasure and comfort, as well as it works intelligently to warn for any problem. In this article, a system is created that is controlled by an AVR controller and is used to turn on and off the applicant's appliances and home automation. This embedded system includes an AVR microcontroller, a mobile phone, a led bulb for alerting, a stepper motor, a solar panel for storing energy, a battery for storing energy, a rectifier for converting ac to dc, an inverter for converting dc to ac, and a ldr sensor for sensing light intensity[3].

1. Home Automation:

Home automation is a one-of-a-kind system that can control and interact with almost every item in your house, including fans, led lights, bulbs, air conditioners, and refrigerators. The term "home automation" refers to the integration of all household components and equipment. For example, a centralized microcontroller panel may handle everything from heating and air conditioning to security systems, lighting, and electrical appliances in general[4].

Home automation includes things like remotely controlling parts of our house with a computer or mobile device, programming electrical items to react automatically to certain circumstances or scenarios, and centralizing the management of a variety of appliances in our home into a single control center. For example, we can control all of the lights in and around our house from a single location, eliminating the need to leave or go downstairs if we forget to turn off or on any appliances[5].

IOT stands for internet of things;IoT gives us ideas about how the things and physical objects connected with sensors and software or with any other technologies as shown in the Figure 1. The Internet of things helps in data exchange and works accordingly.

Figure 1: IOT in which the Physical Objects Connected With Sensors and Software.

Stepper Motor is used to provide discrete steps of motion to the device by which it is connected. In a stepper motor we can adjust the speed of the stepper motor as shown in the Figure 2. Application of stepper motors is in various places such as motor is used to provide precise position to the device, and in hard disk drives, robotics, antennas, telescopes and some toys[4].

Stepper Motor is used to provide discrete steps of motion to the device by which it is connected. In a stepper motor we can adjust the speed of the stepper motor. Application of stepper motors is in various places such as motor is used to provide precise position to the device, and in hard disk drives, robotics, antennas, telescopes and some toys. The Figure 3 shows home automation using Arduino.

Figure 2: Stepper Motor to Provide Discrete Steps of Motion to the Device by Which It Is Connected.

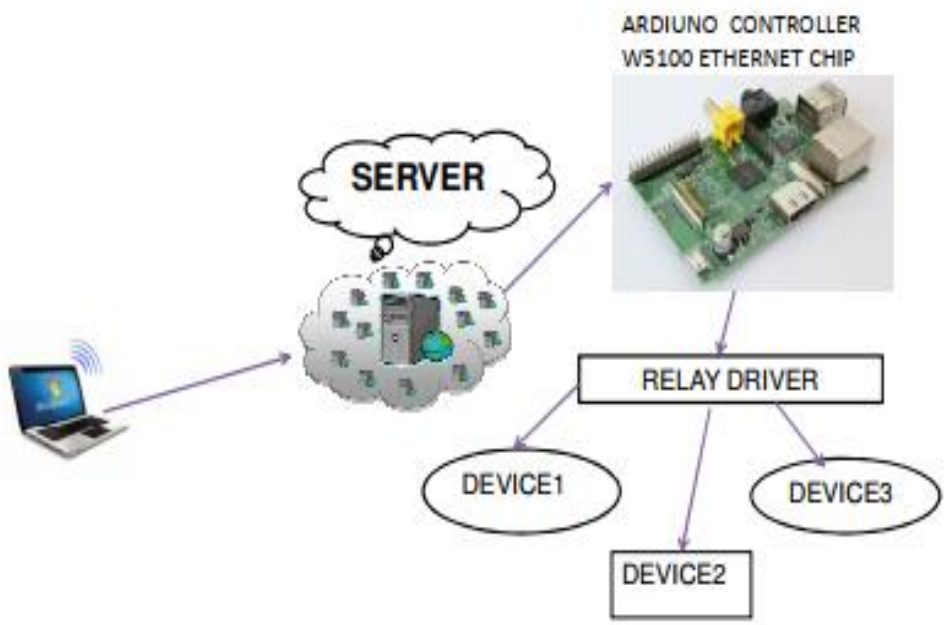

Figure 3: Home Automation using the Arduino

The phrase "home automation" refers to the coordination of all household entities and equipment. A centrally controlled microcontroller panel, for example, may manage anything from heating and air conditioning to security systems, lights, and electrical appliances in general[7][8].

LITERATURE REVIEW

A Review Paper on Home Automation by Nikita Baidya, Prem Kumar S discussed what is home automation in which he discussed that home automation refers to a certain function that may be used to control and build an online connection between home appliances. The phrase "home automation" refers to the coordination of all household entities and equipment.

A centrally controlled microcontroller panel, for example, may manage anything from heating and air conditioning to security systems, lights, and electrical appliances in general. In this paper, examples of automation are discussed, including the implementation of the internet of things for home automation, a bluetooth-based wireless home automation system using an FPGA, hand gesture-based home automation for the visually impaired, and home automation using an atmega328 microcontroller and Android [9].

There have been some main controllers used to control many automated processes whether in the home, office, or any other industry, some main controllers such as the Arduino uno board, which is very useful and most popular controller in the industry, Arduino uno interfaces shows and explains an Interface, which is the method by which home automation controller attracts with user requirements. Touch Panels, Keypads, Remotes, Mobile Devices, and the Internet are all examples of interfaces. The control technique utilized by the controller is also explained in this article, which includes a controller, interfaces to communicate with the controller, and sensors that inform the controller about what is going on in the home.

This article also examined the Wi-Fi module and its benefits and drawbacks, presented a block diagram of the Wi-Fi module and its application, and explained how we may use Wi-Fi in our everyday life. The term "integrated circuit" refers to a circuit that is utilized in a variety of electronic applications. In this article, the ULN IC has been described, as well as the use of the IC and its benefits and drawbacks[10].

Satish Palaniappan, Naveen Hariharan, Naren T Kesh, Vidhyalakshmi S, Angel Deborah S discussed GSM based home automation in a research paper titled Home Automation Systems - A Study, in which he discussed system which is discussed in this paper provides three ways to control the GSM based home automation, in which he discussed system which is discussed in this paper provides three ways to control the GSM based home automation, in the control technique utilized by the controller is also explained in this article, which includes a controller, interfaces to communicate with the controller, and sensors that inform the controller about what is going on in the home. Home automation can be done with different controllers in this paper explains the bluetooth base home automation, explain phone based home automation in which explains that some systems are described as an enabling system that can be used to provide a common framework for home automation in which explains that some systems are described as an enabling system that can be used to provide a common framework for home automation in which explains that some systems are described as an enabling system that can be used to provide a common framework for home automation in which explains that It offers a smart home system with features including a system controller, housewide wiring, and a single interface.

This will allow the current system to be used for home automation. This article discusses ZigBee-based home automation and displays a block design of the transmission unit, as well as the wireless communication system and block diagrams of the transmitter and reception sections. This article also discusses various mixed type controllers that are utilized for home automation. And it describes what remote control HAS been and how it works.

Kusuma S M addressed house automation using the internet of things in a study paper titled Home Automation Using Internet of Things by Vinay sagar K N, and the advantages of the internet of things in everyday and industrial life. Making the procedure simple and quick, as well as describing the whole process and components connected to home automation, is what home automation and office automation, or any other automation, entails[11].

DISCUSSION

This research paper has two main parts: the solar panel on the roof and the motion detection light switching system in the room. Smart home automation with solar tracker is used in this research paper, which helps in making home smartly automated and different controllers and motors are used to run solar panels in an effective manner. A stepper motor is used to drive the solar panel, which is controlled by a microprocessor. To absorb the most energy, the solar panel will constantly face the sum at a perpendicular angle. A signal may be transmitted from here to the room light switching system to turn on or off the light based on the quantity of solar radiation present outside, or by monitoring the stepper motor angle, i.e. sending a signal when the angle exceeds a certain degree. The second part consists of a PIR (passive infrared) sensor that detects motion in a room and is controlled by a microcontroller; when it detects human presence in the room, it will turn on the light; when it detects no human presence in the room, it will turn off the

light after a threshold time limit. In this paper, the energy absorbed by the solar panel is then stored in a battery, which is dc power, and this dc power is then supplied to the bulb and fan. However, some appliances require ac power, so we must convert absorbed dc power to ac power using an inverter, and a rectifier is installed to convert dc power to ac power. It also reduces energy consumption, resulting in lower power bills, and it enhances security while also increasing our home's comfort level. There have been numerous applications that are based on IoT or any other controller that makes that system smart and automated, thus this article addressed what should be an ideal system of home automation with remote access, taking care of all of those tasks.

CONCLUSION

In this century, the internet has become very important, and many applications have been working on the internet of things. The world is crowded with mobile phone users, and Android has become the most popular and successful mobile device. It is also very flexible in terms of adding new functions, and it has evolved into an open and growing source that can run any advancement technology. The human brain is very creative when it comes to thinking, and mobile apps are utilized to help people think more creatively. This article addressed home automation utilizing a solar tracker, with the process controlled by an AVR microcontroller. This allows us to manage and control our homes intelligently, as well as conserve energy and build such a system at a low cost. There are many benefits to putting such systems in the home, including the ability to decrease energy costs, flexibility, and security. It also reduces energy consumption, resulting in lower power bills, and it enhances security while also increasing our home's comfort level. There have been numerous applications that are based on IoT or any other controller that makes that system smart and automated, thus this article addressed what should be an ideal system of home automation with remote access, taking care of all of those tasks. This article describes what an ideal system is and how it should operate in real time, as well as providing real-time data to users that wish to view the update. Also, describe what a GSM system is and how it may assist with home automation. A GSM system has one data channel that is utilized to offer internet connectivity. The Internet is becoming faster and more popular. In addition, many tasks are dependent on the internet provider; the internet enables equipment to utilize the internet of things and its functions. A web application with a mobile application should be used as the user interface. In order for individuals of all sorts to have access to the system.

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A STATISTICAL ANALYSIS OF THE EFFECTS OF WATER CONTAMINATION ON RURAL AREAS

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ABSTRACT

The economic consequences of industrial water contamination in rural areas are assessed in terms of losses to agricultural output, human health, and animals in this study. The cost estimates are based on comprehensive primary (household level) data gathered from an exhaustive study of two villages in Andhra Pradesh, South India–one a pollution-stricken village and the other a control village (not impacted by pollution). The cost calculations showed that industrial pollution has a significant monetary effect on rural areas. The compensation concept, according to the study, may work if damage estimates are reasonable. Furthermore, just enacting laws and establishing administrative structures are essential but insufficient to solve environmental issues. Policies must be applied in the proper context. Institutions should be robust enough to cope with the issues at hand, with greater autonomy and capabilities.

KEYWORDS:*Andhra Pradesh,Contamination, Costs, Environment, Rural Communities, South India, Water Pollution.*

1. INTRODUCTION

Water quality is an essential component of water resources that has received little attention. While fast industrialization in developing nations has aided economic growth, it has also resulted in significant economic losses due to adverse impacts on agricultural operations, human health, and the environment as a whole due to air and water pollution. Water contamination, in general, is a significant problem because of its effect on a wide range of economic activities. In the setting of an agricultural economy like India, the issue of water pollution takes on more significance. While the problem's scope is modest and widely dispersed, the losses incurred as a result of its effect are significant. Despite the fact that there has been many empirical research on agricultural-related environmental issues such as soil deterioration, wind and water erosion, only a few studies have focused on industrial pollution and its effect on agriculture and other industries. Though few researchers calculated the costs of environmental degradation in terms of human health, soil erosion, deforestation, and other factors at the macro level, the bulk of the indicators are unrelated to industrial pollution. Damage costs in poor nations have been demonstrated to be greater than in developed ones[1]. Environmental costs in poor nations were estimated to be about 5% of GDP, according to their calculations. In industrialized nations, a few

studies have looked at the effect of industrial pollution on agriculture, human health, and ecosystems. According to few researchers, the most significant and immediate effects of environmental deterioration in the poor countries are harm to human health. In Chongqing, one of China's severely polluted megacities, scientists attempted to quantify the effect of industrial pollution on agricultural, human health, and industrial activity. The overall expenses of industrial pollution were projected to be 1.2 percent of Chongqing's gross domestic product. The agricultural sector accounts for 56% of the total, while human capital and the industrial sector account for 20% and 18%, respectively[2]. These studies show that industrial pollution has a significant impact on other economic sectors. In recent years, India has attempted to quantify the different effects of industrial pollution and sewage on human health, agriculture and livestock, and other economic sectors. Most of these studies, however, make estimations based on a single reference point. They haven't taken into consideration changes over time or compared the impacted circumstances to those in a control group[3]. This research aims to provide a comprehensive assessment of the costs of industrial pollution on different elements of rural lives. In the context of policy development, such an approach is critical. Furthermore, the study area offers a unique chance to analyze policy dynamics owing to the active participation of civil society, the court, and other stakeholders in the problem-solving process. As a result, governmental interventions to address the issues have previously been attempted in the study area, albeit with little effectiveness. In reality, when local communities protested, a judicial committee conducted an investigation and came up with a compensation plan for rural households, which was rejected. This research would aid us in deciphering the reasons behind the policy's failure. This study attempts to calculate the costs of industrial pollution, focusing on the environmental effect of water contamination on rural populations in general, and agricultural productivity, human health, and animals in particular. The following are some of the most important issues in this regard: (a) links between industrial development and changes in the micro (local) environment, (b) pollution-related damage to crops, livestock, and human health in rural communities, and (c) understanding the reasons for policy failure in addressing the problem. These problems are investigated in depth using primary (household level) data gathered during an extensive study of two villages in the industrial belt surrounding Hyderabad, Andhra Pradesh's capital city—one a pollution-stricken village and the other a control village (not impacted by pollution). Various illnesses caused by water contamination have afflicted the whole hamlet of Kazipalle (polluted village). Skin infection, tooth corrosion, joint discomfort, lack of appetite, faulty eyesight, fever, stomach pain, respiratory illnesses, diarrhea, and other water-borne ailments are common in the contaminated hamlet. In addition, the community has seen overall physical weakness, immature development, and persistent cold and cough in the middle aged and youngsters. Lung infections, fever, and joint discomfort are the most common symptoms. There have been instances when the family's main source of income has been afflicted by severe illnesses, causing the family's economic situation to deteriorate. Though individuals do not drink contaminated water directly, they are exposed to harmful chemical water when working on farms, bathing, washing clothing, and eating, particularly milk and vegetables. When comparing vegetables produced in arsenic-contaminated water to those grown in uncontaminated water, greater arsenic levels were observed, ranging from 9% to 1000 percent depending on the kind of crop. Arsenic poisoning has also been linked to severe health issues, including stillbirths[4].In both the afflicted and control villages, Table 5 shows the proportion of households reporting the frequency of incidence of different illnesses throughout the size classes. Following the advent of pollution in Kazipalle, almost all types of farmers are experiencing joint discomfort and fever. In contrast to the scenario before pollution, the incidence of joint discomfort, skin problems, fever, and stomach ache among medium-sized farmers is very significant. The majority of patients (60%) experienced daily joint pain, with 40 percent reporting skin, fever, and stomach discomfort on a weekly basis. Similarly, everyday joint

discomfort was reported by 95 percent of small farmers and 86 percent of marginal farmers, respectively. After pollution, 63 percent and 72 percent of small and marginal farmers experienced monthly fever. Because of increased exposure, variations in ethylating capacity across people and groups, micro-environment and nutrition, and other factors, the poor are disproportionately impacted. Only fever was the most common complaint across all categories of farmers in the control village, with monthly and annual frequency. The most striking aspect of the pollution-related health issue is that women are the ones who suffer the most . In each family, the proportion of afflicted females is greater. This is because women frequently perform all of the domestic chores with polluted water, such as washing, nursing infants, and so on. Even in the control village, this is true, particularly in the marginal farmer group, where approximately 80% of the women complained of or reported different illnesses. This may be linked to tainted water from the village's tube well (groundwater). They perform all of their home chores using water from the community tube well, which is contaminated[5] . Aside from that, the average number of days unwell and unable to work per family per year in the polluted village is much greater than in the non-polluted village. The difference between the number of days sick and not available for work in both villages before and after pollution is the number of days lost due to pollution.

2. DISCUSSION

The impacts on production approach concept say that an activity's influence on the environment may affect a producer's output, costs, and profitability. If there is a market for goods and services, the value of the change in production, such as the decreased value of fish caught as a consequence of river pollution, may be used to reflect the impacts of environmental impact. EOP has also been used to track the effect of environmental changes on agriculture, forestry, fisheries, electricity, public services, and other sectors, such as soil erosion, deforestation, wetland and reef damage, and air and water pollution. The effect of water pollution (irrigation water) on agricultural production and yearly household losses has been evaluated in our research using real current market prices. Costs of replacement (RC): The replacement cost (RC) method argues that if the environment has already been harmed, it will cost money to restore it to its previous condition. Victims of environmental degradation, for example, replace their environment by relocating away from the afflicted region. The expenses that victims suffer as a result of relocating to a clean environment are referred to as replacement costs. Direct monitoring of actual expenditure on protections against environmental hazards is one of the methods used in the replacement cost method. The replacement cost approach is utilized in this research to evaluate the damage costs of pump sets caused by water contamination. The data on damage costs is based on the actual expenditure of families on repairs and replacements. Human resources (HC): People are seen as economic capital under the human capital concept, and their earnings are treated as a return on investment. Environmental economics is concerned with the impact of poor environmental conditions on human health and the implications for people and society's productive capacity[6]. In this case, the approach would calculate the economic costs of a productive human being being sick. When calculating the economic costs of sickness caused by environmental variables, two variations may be considered: first, the loss of wages (working days) due to illness, and second, the expense of medical care. We estimated the loss of productive time and yearly health-care spending in our research, and then came up with the overall economic loss owing to sickness. It should be emphasized, however, that we did not use medical research or epidemiological evidence to link the disease to pollution. However, laboratory studies of different water samples from the hamlet strongly indicate that there are significant risks of water-borne illnesses. WHO have shown links between water contaminants including arsenic and other metals and health risks? The connection between water contamination and the prevalent illnesses in the communities was also confirmed during our

talks with local physicians. The impacts on production approach concept say that an activity's influence on the environment may affect a producer's output, costs, and profitability. If there is a market for goods and services, the value of the change in production, such as the decreased value of fish caught as a consequence of river pollution, may be used to reflect the impacts of environmental impact. EOP has also been used to track the effect of environmental changes on agriculture, forestry, fisheries, electricity, public services, and other sectors, such as soil erosion, deforestation, wetland and reef damage, and air and water pollution [7]. The impact on production approach concept says that an activity's influence on the environment may affect a producer's output, costs, and profitability. If there is a market for goods and services, the value of the change in production, such as the decreased value of fish caught as a consequence of river pollution, may be used to reflect the impacts of environmental impact. EOP has also been used to track the effect of environmental changes on agriculture, forestry, fisheries, electricity, public services, and other sectors, such as soil erosion, deforestation, wetland and reef damage, and air and water pollution. To evaluate the effect, methods such as with and without, as well as before and after, are often employed. The problem with both with and without methods is that we can't observe pollution-affected households without also observing pollution effects. One way to address this issue is to create a control group that is identical to the pollution-affected group except for the pollution. The afflicted groups counter-factual is provided by the control group. However, this is not simple, as finding such a matching group, at least in terms of observable indicators, is difficult. Alternatively, participants in the program may compare before and after circumstances of the same families. This method necessitates the use of baseline data, which is not always accessible. In this case, the second-best solution is reflexive comparison, which compares before and after scenarios for the participating households. This would allow for realistic effect estimations. To begin with, it should be noted that respondents in most of these types of inquiries have a tendency to overestimate the damages. As a result, it's critical to reduce overestimation bias. Every effort was made to reduce, if not eliminate, bias. To some extent, the overestimation problem is addressed by the double difference method, which compares before and after as well as with and without scenarios. Our discussions with local non-governmental organizations (NGOs) and medical professionals have also aided in the cross-checking of damage losses. Figure 1 Shows The Map Showing Study Villages[7].

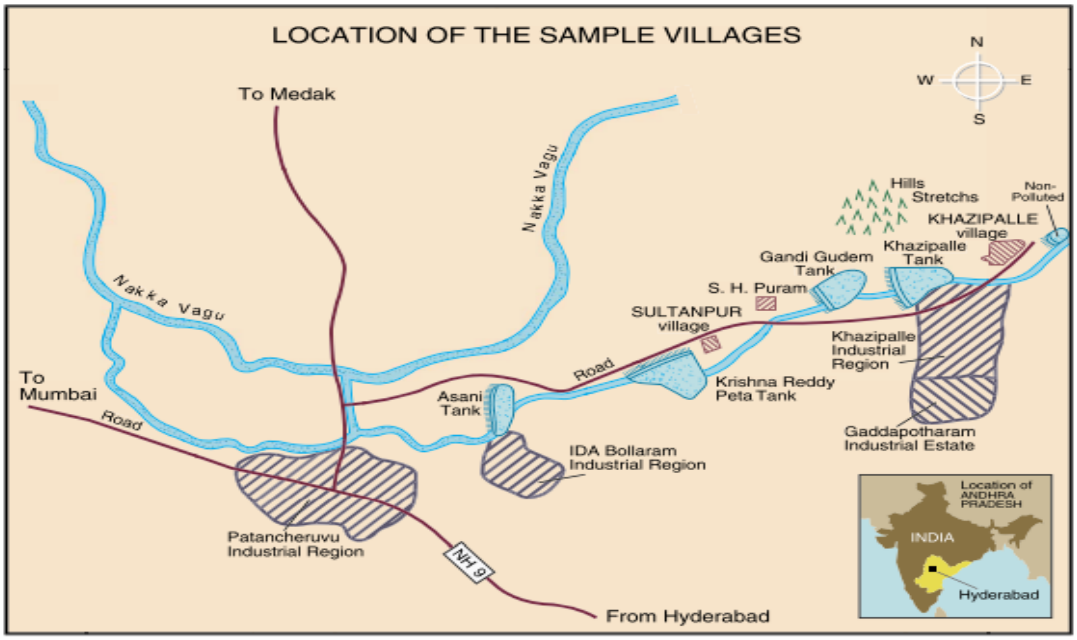

Figure 1: Map Showing Study Villages

2.1.Application:

In rural regions, livestock is often regarded as one of the most important sources of income. All of the local water sources in the contaminated hamlet have been polluted, posing a severe danger to the town's cattle economy. Livestock is forced to rely on contaminated water due to a lack of adequate municipal water sources. As a result of drinking polluted water and grazing on contaminated grasses or grazing areas, livestock have been infected with a variety of illnesses. The locals claimed that during the past five years, 149 livestock perished as a result of drinking contaminated water. Over time, the majority of the cattle get ill. Another major issue in the community is that some cows have lost their ability to reproduce. For their owners, these cows have become a burden. Milk and dung quality has suffered as a consequence of grazing on contaminated grasses and drinking dirty water. People have sold their livestock at extremely cheap prices because they are afraid of further cow fatalities[4].

2.2.Advantages:

To summarize, industrial pollution has a significant monetary effect on rural areas. If social costs such as village alienation (marriages, social visits, etc.) were taken into account, the costs of damage would be much higher. Similarly, determining the true effect on health, both economically and psychologically, is challenging. While there is a risk that respondents will overestimate their damages, we are confident that these excesses would not be greater if social costs were valued. Furthermore, the financial losses incurred by a household's primary breadwinner due to permanent disability are difficult to quantify. In this regard, assessing the problem in terms of pure economic loss valuation is difficult. As a result, the solution to the problem is not to compensate for the loss, but to eliminate the problem entirely. In this case, compensation entails granting the right to pollute. When it comes to the health consequences in this case, no amount of compensation would be enough to solve the problem. Something must be done in addition to compensation to permanently end the problems[8].

2.3.Working:

Apart from lowering agricultural output, contaminated water imposed huge expenses on a variety of agricultural operations, such as corrosion of agricultural equipment, pump set damage, and machine maintenance costs, and so on. Only damage to pump sets has been recorded from Kazipalle village, but other issues such as equipment corrosion and maintenance expenses may have happened earlier. As a result, there has been a decrease in agricultural operations during the past eight years, and they are unable to recall the expenses of repairs or the loss of equipment due to pollution. Pump set damage is still vivid in the thoughts of cultivators since it causes a significant loss to growers. Detergent-laced irrigation water removes lubricants from irrigation oscillates and pumps. Furthermore, an excessive quantity of suspended particles in the water will need regular filter and nozzle cleaning (Pearce et al., 1978). As a consequence, additional expenses such as electric motor maintenance and service, pump set damage, and so on are frequent. These expenses were incurred during the past five years. The annual expenses of repairing and damaging pump sets have been estimated accordingly. The average annual total cost of agricultural operations owing to pollution is Rs. 182 ($3.6) per family per year. Large and medium farmers bear the brunt of the expense of pump set damage. As a result, bore wells are exclusively owned by these farmers. A bore well is not owned by any of the marginal farmers. Large farms have significant per-unit and per-household expenses. Approximately 0.59 hectares per family have become unusable for farming. There is an inverse relationship between farm size and the amount of land that becomes uncultivable, for obvious reasons: big farmers have more land under irrigation per family[9].

3. CONCLUSION

Even though the victims did not agree with the negotiated amount offered by the industries, instead of going to court, the negotiation could have been made more effective and acceptable to all parties by using a realistic estimate of the damages. On the other hand, the majority of families, particularly small and marginal farmers, have benefited indirectly from the industry's job possibilities. Civil society's efforts to improve remuneration for these farmers were ineffective since they account for 90% of the families. Small and marginal farmers lose between Rs. 5000 and 15,000 ($100–300) per family, which is much less than the losses suffered by medium and big farms. Furthermore, since these families are more preoccupied with their day-to-day survival, they are unable to participate in the struggle for justice. Furthermore, their social standing prohibits them from working in the business. The involvement of civic society in this instance is likewise unsatisfactory due to these factors. Both dharma (mass squatting) and rastha rook (road blockage) protests in front of the state Secretariat ended in lathi (cane) charges and arrests of villagers and NGOs. The objections received no response from industry or PCB. People were enraged and began attacking the industries. Since then, companies have ceased dumping their waste into the tank throughout the day. The locals caught the people twice when they were dumping the wastewater into the tank at night and brutally beaten them. After that incident the industries were closed for 3 to 4 days and started again as usual. Despite all these actions, the community did not succeed in influencing either industries or regulatory authorities. The movement could not sustain because a majority of the population have shifted to jobs in the industry leaving agriculture. Thus, the present case study provides an apt example of failure on all fronts, which is mainly due to the nexus between industries, policy makers and politicians coupled with diverse economic interests among the farm households. It is clear that mere passing of laws and creating institutional structures are necessary but not sufficient to address the environmental problems. Policies must be applied in the proper context. Institutions should be strong enough, with more autonomy and powers, to deal with the problems at hand[10].

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IMPROVING NATIONAL PENSION PROVISION BASED ON PENSION SYSTEMS IN DEVELOPED COUNTRIES

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ABSTRACT

Each country organizes its pension system through taking into account its existing economic, demographic and social problems. At the same time, countries with developed and developing economies, need to reform the pension sector to ensure a decent standard of living after retirement, when they reach a certain level of development. This article examines the pension systems of foreign countries and their peculiarities. Criteria for valorization in the pension systems of foreign countries are given. Based on the experience of foreign countries, proposals have been developed to develop an action plan to improve the management system of mandatory pension payments in Uzbekistan.

KEYWORDS: *Pension Provision, Valorization, Foreign Experience, Compulsory Pension Insurance, Tiered Pension Systems.*

INTRODUCTION

Over the last two decades, there has been a broad understanding of the economic stability of states and the role of pension systems in the social security of the elderly population.

Pension provision is an integral part of social protection of the population of any modern state and one of the main and most important guarantees of sustainable development of society. These guarantees, in turn, are included in the pension system, the purpose of which is to provide financial support to citizens when they reach retirement age or other events in their lives (disability, loss of a breadwinner, etc.).

One of the most important goals of pension reform is to ensure financial stability, that is, to pay pensions now and in the future according to the level of collateral, not to lead to unexpected increases in payments, declining pension payments and lack of pension funds to be liquidated from the state budget.

Strong pension reform should be based on financial forecasts, including short-term and long-term cash flow indicators, and an analysis of the status and expenditure of accumulated funds.

The purpose of this article is to develop proposals and recommendations for the application of best international practices in the pension system of Uzbekistan based on the study of the pension system of developed countries. For this purpose, the article defines the following tasks:

- Analysis of various models of pension systems in developed countries;

- identify problems in the global pension system;

- Disclosure of the specifics of the use of "valorization" in the pension system;

- Development of proposals and recommendations for the use of best international practices in the pension system of our country.

Analysis of the relevant literature.

In the study of the experience of foreign countries, especially developed countries, scientific research can be found in the bases of international scientific research. In addition, Uzbek economists have conducted extensive research on international pension systems.

T. Emelyanova, studying the formation of the pension system, divides it into types according to the following characteristics:

- Subsistence and material security of the disabled;

- Taking into account the share of personal labor of the pensioner in the implementation of pension benefits in accordance with the income of the population;

- Pension provision based on personal initiative.

According to A. Ijaeva, the main factors in the classification of the pension system are:

- On the basis of the method of calculating pension payments and contributions;

- On the basis of functional (distribution and fund) aspects of the pension fund;

- In terms of number and form, firstly - the social pension, secondly, the distribution system, thirdly, the savings system, fourthly, the voluntary savings system.

In his research, D. Rakhmonov noted that one of the important features of the pension system is the division into mandatory and voluntary forms.

In our opinion, there are various pension systems in the world today, the most important of which are two- and three-tier pension systems. The three-tier system includes private pension insurance, state-funded pensions and voluntary (non-state pension system, corporate-funded pension system), while the two-tier system includes private and state pension systems.

RESEARCH METHODOLOGY

The methodology of this article used the methods of analysis and synthesis, scientific abstraction, deduction, classification, generalization, comparative and theoretical interpretation.

In addition, the scientific basis of the article consists of data from international standards and normative documents, research of local and foreign scientists in scientific publications.

ANALYSIS AND RESULTS

World experience in the formation and development of various pension models shows that they are all based to some extent on the principles of compulsory pension insurance (CPI). This situation is explained by the fact that the CPI system is most adapted to the requirements of a market economy and meets the interests of different segments of society.

In many countries, national pension systems based on compulsory pension insurance have the following main features:

a) Pension insurance is mandatory and does not depend on the wishes of the insurer (employer) and the insured person (employee). The state appoints CPI subjects and participants;

b) CPI is funded by insurance premiums and (or) insured persons, in which the state may also participate;

c) Insurance premiums are collected in special funds (cash desks), which assign and pay pensions in the event of an insured event;

d) The amount of insurance premiums and the amount of payments depends mainly on the salary or income of the insured person.

Different models of pension systems are used abroad, including state social security, compulsory social insurance, personal pension insurance, and various other social protection institutions. The pension system of most countries consists of three tiers (Table 1).

The right to receive a state pension is granted to persons of a certain age established in that country. However, in some cases, it is possible to retire earlier or continue working after reaching retirement age.

TABLE-1COUNTRIES WITH A 3-TIER PENSION SYSTEM

Country	First tier	Second tier	Third tier
China	compulsory pension insurance	state pension provision	rural pension insurance
France	basic retirement order	mandatory additional pension provision	voluntary pension funds
Russia	compulsory pension insurance	state pension provision	non-state (voluntary) pension provision
Great Britain	state pension	basic state pension	professional pensionfundsof non-satate pension system
Italy	state and compulsory pension system	private pension insurance	voluntary pension insurance
Germany	private pension insurance	state pension	Production pension

In Germany, for example, although the retirement age is 67 for women and men, it is still possible to retire earlier. To do this, you must pay from personal pension funds the amount specified in the pension legislation (0.3% for each month of non-employment).

In France, every Frenchman, regardless of gender, has the right to retire at the age of 60. However, in order to receive a full pension, he must have 40 years of work experience. French citizens receive a full pension at the age of 65, regardless of length of service. A person who continues to work even after retirement is paid an additional 3% payment for each year of service.

U.S. citizens with 13 years of work experience are eligible for a state pension. In America, the retirement age is 65 for women and 67 for men. However, a person who retires earlier will be paid a pension of 75% of the pension.

In China, the retirement age is 50-55 years for women and 60 years for men. Civil servants who have worked for at least 15 years are eligible for a state pension.

In Japan, the retirement age is 65 years. It is possible to retire earlier, but the monthly pension will be reduced by 25 percent. After reaching the age of 65, the amount of pension is increased by 5 percent annually.

Today, compulsory insurance premiums form the basis of the pension system in many countries around the world. However, in most countries, the payment of mandatory contributions is distributed among employers and workers (Table 2).

TABLE-2 AMOUNT OF MANDATORY PAYMENTS TO PENSION FUNDS (BY COUNTRY, 2019)

Countries	**Allocations to state pension funds (%)**		**Allocations to private pension funds (%)**		**Total**
	Employee	Employer	Employee	Employer	
France	11,2	16,3			27,5
Germany	9,3	9,3			18,6
Italy	9,2	23,8			33,0
Japan	9,15	9,15			18,3
South Korea	4,5	4,5			9,0
USA	6,2	6,2			12,4
Russia		22			22,0

Source: OECD short report "Pensions at a Glance 2019"

Currently, the demographic situation in many developed countries is characterized by a slowdown or even a decline in the growth of the working age population. At the same time, there is a sharp increase in the population over the age of 60 and even over the age of 80, which will inevitably lead to an increase in the number of disabled members of society and the disabled, i.e. retirees.

The main problem is that the "aging" countries of the Western world may not be able to pay pensions to their elderly citizens and provide them with the necessary medical and social assistance. The economic growth rates of these countries are not fast enough.In these countries, the downward trend in the number of workers and, consequently, the number of consumers has become apparent. This process may accelerate in the near future. The population of the developed countries of the world has started to live longer, so their retirement period will also be extended.If the elderly don't want to work until they're 70, and entrepreneurs don't start keeping them employed, economic growth will slow by about a third.

All these factors together have already led to a significant increase in the pension burden on state budgets and have raised the issue of reducing the share of the pension system distributed to governments and increasing the share of the funded pension system. However, the experience of different countries shows that reforming the pension system often leads to social unrest, which is associated with raising the retirement age or waiving preferential pensions, or increasing contributions to pension funds.

The following is an in-depth analysis of the pension systems of developed countries on the example of countries, focusing primarily on the US pension system.

As in many countries, the U.S. pension system is divided into two components: compulsory public insurance and voluntary private insurance. In state insurance, social contributions to the pension fund are paid by the employee in the amount of 7.65% of salary, and the employer pays the same amount. Thus, the total fee is 15.3%.Self-emolyed individuals pay for themselves as both workers and employers - a total of 15.3 percent. Unemployment income, such as interest on

bank deposits and bonds, dividends, and income from securities transactions, is not subject to pension tax.

However, the state pension system is unable to provide Americans with a decent standard of living after retirement, as the wage coverage rate is only 30 percent, while 70-80 percent is sufficient to support a normal lifestyle.To minimize the income gap between working and retired people, there are several voluntary pension systems in the U.S. that allow you to save for future retirement.

In the U.S., the pension system is very flexible, for example, an employee can retire at age 62 that is, before reaching retirement age, and receive an incomplete pension.

The pension system of Germany, one of the most advanced countries in Europe, is the most effective pension insurance system, which is based on the principle of solidarity of generations. According to this principle, payments to the Pension Fund are made by the employed population to support current pensioners.

The pension system in Germany consists of three main levels: compulsory pension insurance, corporate pension insurance and private pension insurance. Categories of the population such as workers, employees, civil servants, home-based workers and farmers are provided with compulsory pension insurance.This pension provision applies not only to qualified and employed persons, but also to a group of people (disabled, widows, students, unemployed, etc.) who for some reason have not entered into a full-time employment relationship in society.Although unable to pay insurance premiums, they are participants in the pension insurance system due to the application of the principle of joint redistribution, which applies within the pension system in Germany.

Unlike compulsory pension insurance for workers and employees in Germany, pension insurance for freelancers (doctors, veterinarians, lawyers, notaries, architects, etc.) has its own characteristics. Freelancers who are self-employed pay higher premiums. Therefore, the amount of their pension benefits is also relatively high.

The second tier of the German pension system is corporate pension insurance. This form of protection of the elderly has a sufficiently clear corporate character and is not considered mandatory. The company independently decides the amount of pension and whether or not to pay pensions, often referred to as “corporate pensions,”.

The third level of social protection in old age is private pension insurance. It provides citizens with the opportunity to receive more social benefits than provided for in the compulsory insurance system, as well as an alternative form of insurance for those who do not participate in compulsory pension insurance. Unlike compulsory pension insurance, the premiums paid to private insurance companies are significantly higher, while the amount of such pensions is also higher.

The three-tier pension insurance system in Germany is mainly based on the principle of distribution of pension benefits and also has some accumulative elements.

Thus, the liability for pension insurance is determined not by the amount of income, if we do not consider low-income people, but by belonging to a particular social group.

The employer pays its share of social security for the employee on a monthly basis. Contributions to the pension system during military or alternative service are paid by the state. In Germany, due to the increase in life expectancy and the decrease in births, the amount of mandatory contributions to the state Pension Fund is constantly increasing, and today it is 20 percent of the employee's salary. In Germany, the retirement age is 67 for women and men. The German government is working hard to raise the retirement age to 70 years.

Another European country, the Italian pension system, represents a three-tier system formed as a result of many reforms implemented over a long period of time.

The first tier of the Italian pension system is compulsory state insurance based on the principle of distribution. The employee allocates a portion of the funds for his or her maintenance after retirement.

Each employee, regardless of their type of activity, is obliged to pay contributions from the income received.

Contributions paid during the period of employment determine the amount of the monthly pension, which depends on the number and amount of payments made by the employee.

There are several types of pensions:

- Old age pension, which is paid when the employee reaches retirement age, in which case the employee must have paid the minimum amount of contributions;

- Old-age pension, which is granted without the condition of reaching a certain age. The employee must work the prescribed length of service, i.e. have the required specific length of service;

- Disability pension is paid to the category of persons who terminate their employment early due to deteriorating health;

- Survivor's pension is paid to family members whose breadwinner has died.

The main reason for the introduction of the second and third stages (additional pension system) is the observation of a decrease in the wage recovery ratio when receiving pension payments from the state pension insurance system, which constitutes the first stage.

Additional pensions in the second tier of the Italian pension system are provided only at the expense of non-state pension funds. Additional pension is a tool that allows you to combine mandatory and additional pensions at retirement. An additional pension is not as the same as mandatory pension.A personal account is opened for each employee, the proceeds of which are then invested in financial instruments (shares, bonds, debt obligations, mutual funds) in the financial market. The profitability of these instruments is determined by the trends in the financial market and the choice of management method.

After the reform, non-state pension funds can be divided into three categories:

- Contractual pension funds;

- Open pension funds;

- Personal pension plans, which in turn are a real insurance policy.

Contractual pension funds established for the benefit of certain categories of workers are considered closed:

- Private workers belonging to the same contract category, the same company or group of companies, the same territory;

- Family members of the employee, if it is provided by the charter of the fund;

- Civil servants belonging to specific areas;

- Members of workers' cooperatives;

- Private entrepreneurs and freelancers engaged in certain activities.

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- Members of workers' cooperatives;

- Private entrepreneurs and freelancers engaged in certain activities.

Open pension funds are an additional pension source that can register anyone who intends to receive an additional pension, regardless of employment status. A distinctive feature of open funds from professional funds is the ability to directly manage the funds received at the expense of the fund.

Entities that can form open pension funds include banks, asset management companies, brokerage companies, insurance companies. The fund's assets are not related to the company's assets. In the event of bankruptcy of the company that established the fund, the assets of the open pension fund may not be used to meet the claims of creditors. Even non-working people can become members of an open pension fund.

There are open pension funds that implement individual retirement plans for individuals. Their advantage is the ability to take a break from paying fees and then resume.

The third stage of the Italian pension system is characterized by various forms of asset storage, which is carried out through the use of instruments such as life insurance policies, mutual investment funds, postal certificates of deposit, bonds.

Currently, an Italian citizen can become a full-fledged pensioner at the age of 66. This is the same retirement age for men and women. A few years ago, the age limit was a few months lower. The increase in the retirement age is associated with the rapid aging of the population.

According to the World Health Organization, average life expectancy in Germany is 83.1 years, in Italy - 82.7 years, in the United States - 79.3 years, in Russia - 70.5 years. Thus, German retirees receive an average of 16 years, Italians - 16 years, Americans - 12 years, Russians - about 10 years.

In the world practice, the "valorization" indicator is widely used in the pension system. Valorization is the adjustment of the amount of previous income in accordance with the changes in living standards that occurred in the period between the start of work experience and retirement savings. It is clear that there is no need to valorize the pension when using the schemes of calculation of the final salary. Valorization has become a permanent practice in long-term pension payment schemes.

Until recently, although valorization had a significant impact on pension payments, it received less attention than an indexation policy similar to valorization in the payment of pensions.

TABLE-3INCOME LEVEL AND VALORIZATION: SCHEMES FOR CALCULATING PENSIONS BY INCOME LEVEL

Countries	**Income, the duration of its measurement**	**Valorization**
United Kingdom	The average level of income over the total period of employment	By average income level
Germany	The average level of income over	In terms of the average income

	the total period of employment	level, it is adjusted according to the change in the level of deductions for the selected pensions
Italy	Average income level for the whole period (nominal values)	Transition to a system of calculations based on the level of GDP growth once in 5 years
United States	35 years with the highest income	On the average income level for individuals under the age of 60, on the price level for individuals aged 62 to 67 years
France	20 years with the highest salary, transition to 25 years (for state schemes)	By price level (for state and professional schemes)
Japan	Average level of income in employment (occupational pension)	By average income level

The table shows that adjustments related to valorization in income-based pension systems are made in different ways. A direct result of valorization in conditional-savings account systems is the application of a conditional interest rate, which also serves to adjust pension payments between the time they are accumulated and the time they are paid. In point-based systems, the procedure for revaluing a retirement score leads to the same result. The last column of Table 3 shows the rules of valorization, as well as the rules of the relevant conditional-savings accounts and points system.

CONCLUSION

There is a high need to improve the management system of compulsory pension insurance based on the experience of foreign countries to increase the efficiency of management of the system of compulsory pension insurance in the Republic of Uzbekistan. To do this, it is necessary to develop measures aimed at:

a) Implementation of the principle of tripartism in decision-making on the development of pension legislation and optimization of the mechanism of interaction of social partners;

b) Conducting the activities of compulsory pension insurance and other types of compulsory social insurance on the basis of common principles using a common database;

c) Harmonization of compulsory pension insurance with other types of compulsory social insurance;

g) Formation of a single actuarial evaluation system, including standardization of actuarial activities;

d) Improving the legislation governing the activities and legal status of the Pension Fund of the Republic of Uzbekistan.

In addition, in order to increase the targeted provision of social guarantees and legalize the hidden labor market, it is necessary to improve the system of personalized registration of citizens in the field of compulsory pension insurance, electronic record keeping of labor and social documents of citizens.State pensions are the main source of livelihood for certain segments of the population. For another category of socially vulnerable citizens, they are the non-core but significant income of the family budget. Therefore, the pension system in the country must always be stable and strong. In conclusion, state pensions in the country are regulated by

constantly updated and improved legal norms.The pension system works stably and rationally. However, in order to increase the efficiency of retirement activities, it is necessary to make some changes to the regulatory framework, which will lead to significant positive changes.

Thus, the pension reform in Uzbekistan is based on global development trends in this area through taking into account foreign experience, especially the experience of foreign countries such as the United States, Germany and Italy.An important element of pension reform in this group of countries is the increase in the amount of pension savings. It is the accumulative part that is a means of eliminating the dependence of the pension system on demographic trends and increasing the overall level of pension payments.An analysis of the key elements of pension reform in Germany, Italy and Russia suggests that the new Uzbek pension system is not the same as in European countries, but has some commonalities. In developing a new pension model, Uzbekistan should undoubtedly rely on new foreign pension schemes, but at the same time keep in mind that pensioners have their own characteristics, which are determined by factors such as income, national financial market development and inflation.

As the world experience shows, there are two ways to solve the financial problems of pension systems:

1) To maintain the state distribution pension system, albeit in a slightly reformed form, and at the same time to encourage the development of additional voluntary private pension programs;

2) Introduction of a new multi-level distribution-funded pension system financed from various sources.

In short, the development of pension systems in foreign countries is associated with many areas of society, such as the development of the economy, social sphere, and insurance culture of the population, financial institutions and the peculiarities of the demographic situation.It is necessary to rely on the study of international experience in the development and implementation of measures to improve pension systems, the use of science-based approaches to assess the prospects for the development of compulsory and voluntary pension insurance.

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STUDY OF THE SOLUBILITY OF THE PHOSPHORIC ACID-HEXAMETHYLENETHETHRAMINE-WATER SYSTEM

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ABSTRACT

The article presents the results of studies on the solubility of the phosphoric acid-hexamethylenetetramine-water system. The formation of new chemical compounds was established, which were identified by methods of physicochemical analysis. In addition, the results of a study on thermal analysis of 2 $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$ at various temperatures are presented.

KEYWORDS: *Phosphoric Acid, Hexamethylenetetramine, Solubility, PolythermOf The System, Liquid Phase, System.*

INTRODUCTION

One of the key tasks facing fundamental and applied science is to solve problems and take a non-standard approach to improving the reliability of equipment operation and protecting materials from aggressive influences in oil and gas production and processing enterprises [1].

There are several ways to determine the rate of corrosion in various environments [2]. Of these, modern and not inferior in accuracy in determining the rate of corrosion by the classical method, a method using the measurement of polarization resistance. Based on the experimental data, graphical dependences of the change in the polarization resistance of the electrodes over time were plotted, and the corrosion rates were calculated depending on the thickness of the coatings.

In order to characterize the interaction of components in an aqueous medium and to obtain

materials for an anticorrosive coating based on phosphoric acid, hexamethylenetetramine, the solubility in the H_3PO_4 - $(CH_2)_6N_4$-H_2O system was studied by the visual polythermal method [3].

Heterogeneous equilibrium in the H_3PO_4 - $(CH_2)_6N_4$ - H_2O system was studied by five internal sections in a wide concentration and temperature range. Based on the results obtained, a polythermal diagram of the solubility of this system was constructed: from the eutectic freezing point

(-86,8^{0}C) up to 70,0^{0}C. The liquidus surface of the solubility diagram of the H_3PO_4 - $(CH_2)_6N_4$-H_2O system consists of eight crystallization fields of solid phases: LED, $2H_3PO_4 \cdot H_2O$, $(CH_2)_6N_4 \cdot H_2O$, $(CH_2)_6N_4$, $2(CH2)_6N_4 \cdot H_3PO_4$, $(CH_2)_6N_4 \cdot H_3PO_4$, $(CH_2)_6N_4 \cdot H_3PO_4\, 2H_2O$, $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$ (Figure 1).

The fields converge at eight triple invariant points of coexistence of three different solid phases (Table 1). The polythermal diagram shows the solubility isotherms every 100^{0}C.

In the studied system, compounds of the following compositions are formed as new phases: $2(CH_2)_6N_4 \cdot H_3PO_4$, $(CH_2)_6N_4 \cdot H_3PO_4$, $(CH_2)_6N_4 \cdot H_3PO_4\, 2H_2O$, $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$.

The crystallization fields of the compound $(CH_2)_6N_4 \cdot H_3PO_4$ occupy the main part of the polythermal diagram, which indicates its low solubility in comparison with other components of the system. The system has three double and eight triple nodal points and equilibrium solution compositions.

According to the solubility diagram, as a result of the interaction of phosphoric acid with hexamethylenetetramine in the H_3PO_4 - $(CH_2)_6N_4$ - H_2O system, hydrated compounds are formed with a phosphoric acid: hexamethylenetetramine molar ratio of 1: 1 and 1: 2. It was found that hydrated compounds with a molar ratio of the starting components of 1: 1 exist under relatively low temperature conditions. Above 28 ^{0}C they do not exist in the system.

The formation of the compound with the ratio H_3PO_4 :$(CH_2)_6N_4$ 1: 2 occurs in the region of the system richer in hexamethylenetetramine. The minimum concentration of phosphoric acid that causes the formation of this compound - 8,8%.

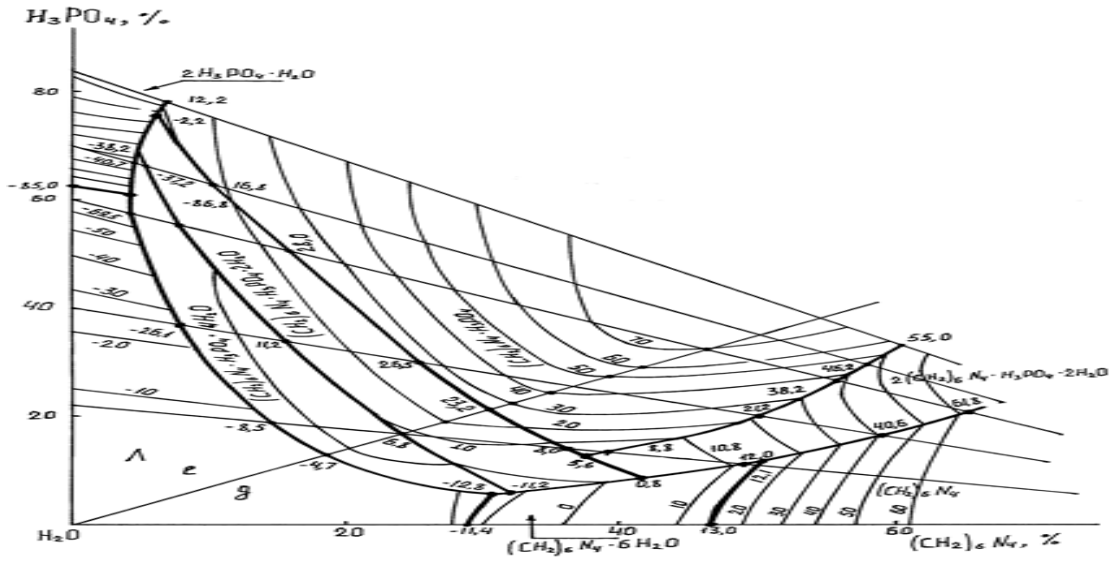


Fig. 1. Polythermal diagram of the solubility of the phosphoric acid-hexamethyleneteramine-water system.

TABLE 1 DOUBLE AND TRIPLE POINTS OF THE SYSTEM PHOSPHORIC ACID - HEXAMETHYLENETETRAMINE - WATER

Liquid phase composition, %			Tem-ra kr, ^{0}C	Solid phase
H_3PO_4	$(CH_2)_6N_4$	H_2O		
-	28,8	71,2	71,2	LED+ $(CH_2)_6N_4 \cdot 6H_2O$
5,6	30,8	63,6	63,6	LED + $(CH_2)_6N_4 \cdot 6H_2O$+$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$
12,9	18,4	68,7	68,7	LED+ $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$
19,0	14,4	66,4	66,4	Also
47,0	8,0	45,0	45,0	” ”
57,6	4,4	38,0	38,0	” ”
61,0	4,0	35,0	35,0	LED+$2H_3PO_4 \cdot H_2O$+$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$
62,5	-	37,5	37,5	LED+$2H_3PO_4 \cdot H_2O$
66,8	4,8	28,4	28,4	$2H_3PO_4 \cdot H_2O$+$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$
68,4	5,2	26,4	26,4	$2H_3PO_4 \cdot H_2O$+$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$+$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$
66,3	5,6	28,1	28,1	$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 4H_2O$+$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$
55,4	8,0	36,6	36,6	Also
34,0	15,6	50,4	50,4	” ”
16,8	24,0	59,2	59,2	” ”
6,0	32,0	62,0	62,0	$(CH_2)_6N_4 \cdot 6H_2O$+$(CH_2)_6N_4 \cdot$

				$H_3PO_4 \cdot 4H_2O + (CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$
8,8	41,2	50,0	50,0	$(CH_2)_6N_4 \cdot 6H_2O + (CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O + 2(CH_2)_6N_4 \cdot H_3PO_4$
12,9	37,2	49,9	49,9	$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O + (CH_2)_6N_4 \cdot H_3PO_4 + 2(CH_2)_6N_4 \cdot H_3PO_4$…
11,7	50,0	38,3	12,0	$(CH_2)_6N_4 \cdot 6H_2O + (CH_2)_6N_4 + 2(CH_2)_6N_4 \cdot H_3PO_4$
-	46,5	53,5	13,0	$(CH_2)_6N_4 \cdot 6H_2O + (CH_2)_6N_4$
11,1	49,8	39,1	12,1	Also
16,6	59,3	24,1	40,6	$(CH_2)_6N_4 + 2(CH_2)_6N_4 \cdot H_3PO_4$
20,9	65,5	13,5	61,8	Also
14,1	36,0	49,9	49,9	$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O + (CH_2)_6N_4 \cdot H_3PO_4$
21,3	30,1	48,6	48,6	Also
30,2	25,2	44,6	44,6	-
50,6	16,0	33,4	33,4	-
62,9	10,6	26,5	26,5	-
75,4	6,5	18,1	18,1	$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O + (CH_2)_6N_4 \cdot H_3PO_4 + 2H_3PO_4 \cdot H_2O$
78,2	7,0	14,8	14,8	$(CH_2)_6N_4 \cdot H_3PO_4 + 2H_3PO_4 \cdot H_2O$
13,6	38,8	47,6	8,8	$(CH_2)_6N_4 \cdot H_3PO_4 + 2(CH_2)_6N_4 \cdot H_3PO_4$…
20,1	50,2	29,7	21,2	Also
26,6	56,0	17,4	38,2	-
29,5	58,2	12,3	46,2	-
33,2	60,6	6,2	55,0	-
11,2	48,8	40,0	10,8	$(CH_2)_6N_4 \cdot 6H_2O + 2(CH_2)_6N_4 \cdot H_3PO_4$…

The compounds found in the studied system were isolated in the crystalline state from the assumed region of their crystallization and identified by chemical, X-ray phase, IR spectroscopic and thermogravimetric methods of physicochemical analysis.

From the results of the chemical analysis shown in Table 2, it can be seen that the content of phosphoric acid, hexamethylenetetramine and water in the obtained compounds is in good agreement with the composition described for them.

TABLE 2 CHEMICAL COMPOSITION OF THE ISOLATED COMPOUNDS OF HEXAMETHYLENETETRAMINE WITH PHOSPHORIC ACID

Compound	**Found, %**			**Calculated, %**		
	H_3PO_4	$(CH_2)_6N_4$	H_2O	H_3PO_4	$(CH_2)_6N_4$	H_2O
$H_3PO_4 \cdot (CH_2)_6N_4 \cdot 4H_2O$	31,56	45,22	23,22	31,61	45,16	23,23
$H_3PO_4 \cdot (CH_2)_6N_4 \cdot 2H_2O$	35,80	51,05	13,15	35,77	51,09	13,14

$H_3PO_4 \cdot (CH_2)_6N_4$	41,23	58,77	-	41,18	58,82	-
$H_3PO_4 \cdot 2(CH_2)_6N_4$	23,71	67,86	8,43	23,67	67,63	8,70

Comparison of interplanar distances and relative intensities of diffractoliniums of hexamethylenetetramine and its hydrated compounds with phosphoric acid show that the new compounds differ from those for the initial component. Compounds $(CH_2)_6N_4 \bullet H_3PO_4 \bullet 2H_2O$ and $2(CH_2)_6N_4 \bullet H_3PO_4 \bullet 2H_2O$ have an individual crystal lattice (Table 3) [4].

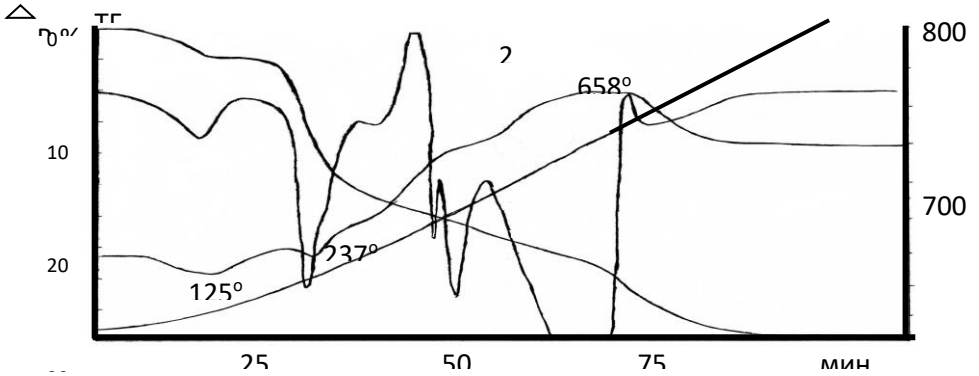
TABLE 3 INTERPLANAR DISTANCES AND RELATIVE INTENSITIES ON X-RAY DIFFRACTION PATTERNS OF HEXAMETHYLENETETRAMINE AND ITS COMPOUND WITH PHOSPHORIC ACID

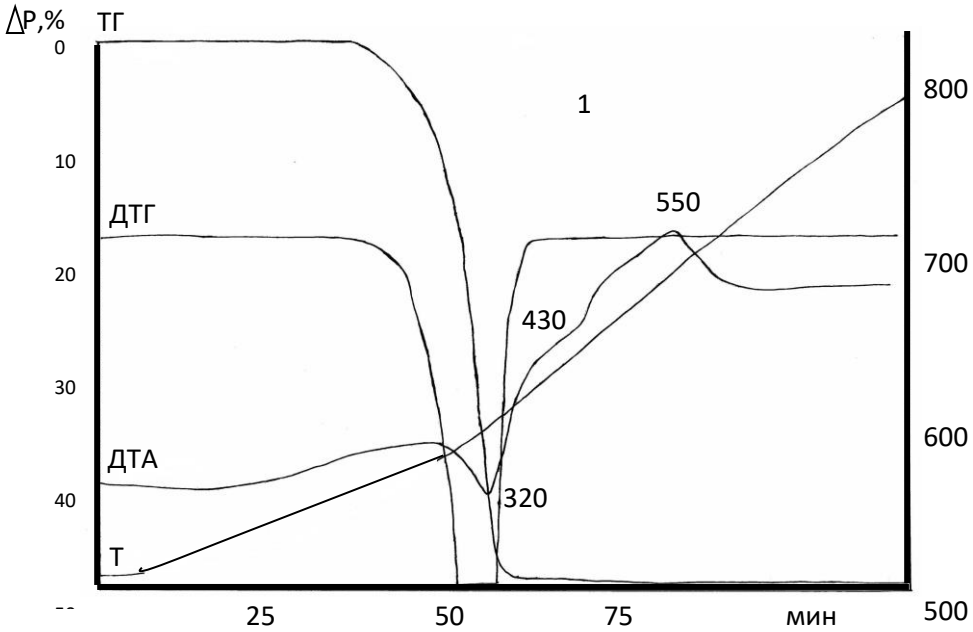
Compound	d, A	I, %	d, A	I, %	d, A	I, %
$(CH_2)_6N_4$	12,107	9,0	4,618	25,0	2,415	15,5
	8,321	17,0	4,035	70,0	2,190	100,0
	7,794	21,0	3,602	15,0	2,013	99,0
	6,398	49,0	2,647	85,4	1,655	13,0
	5,858	69,8	2,570	11,0	1,585	40,0
$(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$	5,766	42,0	3,155	24,0	1,970	11,0
	5,752	41,5	3,106	50,0	1,885	6,5
	5,262	38,5	2,712	30,0	1,857	6,0
	5,074	58,0	2,443	15,0	1,775	6,8
	4,706	100,0	2,402	14,0	1,734	3,5
	4,307	98,0	2,212	13,0	1,707	4,5
	3,507	36,0	2,211	18,0	1,6482	5,0
	3,366	23,0	2,023	12,5	-	-
$2(CH_2)_6N_4 \cdot H_3PO_4$	9,461	41,0	3,105	72,0	2,082	26,0
	8,279	30,0	2,894	24,0	2,036	11,0
	6,398	32,0	2,862	21,0	2,017	14,0
	5,578	46,0	2,775	26,5	1,990	13,5
	5,262	85,0	2,590	32,5	1,941	9,5
	4,947	98,0	2,450	15,0	1,717	15,5
	4,468	100,0	2,405	27,0	1,707	6,0
	3,759	31,5	2,280	16,0	1,617	5,0
	3,469	20,0	2,180	18,5	1,593	5,5
	3,255	92,0	2,170	33,5		

The heating curve of the hexamethylenetetramine sample shows endo-effects at 170^0C; 320^0C and exo effects at 430^0C; 550^0C (Figure 2).

The nature of the first endo-effect is due to the onset of decomposition of hexamethylenetetramine. Weight loss in the temperature range 150-250^{0}C according to the TG curve is 8,42%. A further increase in temperature leads to intensive decomposition of the product. In the temperature range 250-390^{0}C, the weight loss is 89,47%. The nature of the subsequent exothermic effects is due to the combustion of thermolysis products. Total weight loss along the curve TG is 99,47%.

The DTA curve (Figure 2) of the compound $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$ is somewhat different from that of hexamethylenetetramine. The DTA curve shows two endothermic effects at 125 and 237^{0}C and two exothermic effects at 420 and 658^{0}C. The endothermic effect at 125^{0}C is accompanied by a weight loss of 13%. A further increase in temperature leads to intensive decomposition of the product. In the temperature range 175-295^{0}C, the weight loss is 34,36%.





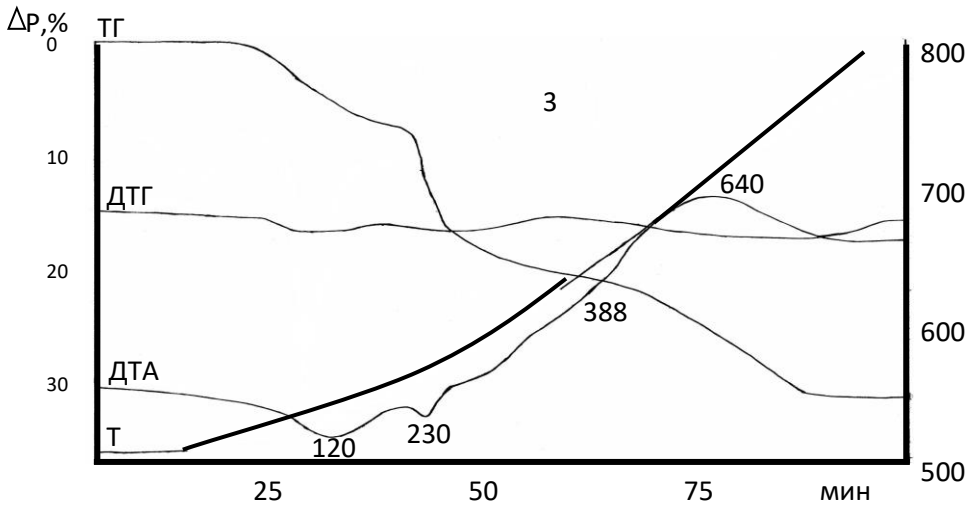


Fig. 2. Derivatograms $(CH_2)_6N_4$ (1), $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$ (2) и $2(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$ (3)

It is shown that a further increase in temperature leads to the destruction of thermolysis products. The last two exothermic effects occur with the combustion of the remaining product. The total weight loss at 700^0C, according to the TG curve, is 38% [5].

Thus, the heating curve 2 $(CH_2)_6N_4 \cdot H_3PO_4 \cdot 2H_2O$ is characterized by endothermic effects at 120^0C; 230^0C and two exothermic effects at 388^0C - 638^0C. The first endothermic effect occurring in the temperature range 90^0C-120^0C corresponds to the removal of crystallization water. At the same time, the weight loss is 8,43%. The second endothermic effect occurs in the range 130^0C-230^0C. The weight loss is 10%. The nature of the endothermic effect is due to the intensive decomposition of the product. Weight loss in the range 200^0C-310^0C is 37,35%. Further heating leads to decomposition and combustion of decomposition products. The total weight loss is 97,23%. This is because the thermal behavior of hexamethylenetetramine and its compound with phosphoric acid differ from each other.

Thus, based on the data obtained and the study of the solubility of the phosphoric acid-hexamethylenetetramine system (aqueous solution), it should be noted that the new compound formed makes it possible to obtain and further use anti-corrosion coatings on metal structures with manifestations of rust.

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A REVIEW PAPER ON VIRTUAL REALITY

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ABSTRACT

Virtual reality teaching and learning applications have been a focus of academic study for decades. There have been big developments over the last five years and technology for virtual truth is moving closer to education. This document provides an overview of the use of virtual reality in education on the Oculus Rift network, in particular. This article examines the uses of virtual reality in education, with an emphasis on the Oculus Rift platform. The goal of this study is to see how virtual reality may be utilized in education and learning. This study's results show how information is provided in virtual reality apps and which the best educational virtual reality applications for users are. This research aims at investigating the recent use of virtual reality in education and learning. The results of this study demonstrate how the curriculum material is distributed in applications of virtual reality and what the best applications of education in virtual reality are.

KEYWORDS: *Application, Augmented Reality, Construction, Input, Virtual Reality.*

1. INTRODUCTION

Virtual reality (VR) is a virtual experience that may be both comparable and dissimilar to the actual world. Virtual reality has a variety of uses, including entertainment (such as video games), education (such as medical or military training), and business (e.g. virtual meetings). Augmented reality and mixed reality, often known as extended reality or XR, are two more kinds of VR-style technologies. There are two kinds of virtual reality: immersive VR and text-based networked VR (also known as "Cyberspace").When you move your head, the immersive VR alters your perspective. While both VRs are suitable for teaching, distant learning is best done in cyberspace. In certain instances, these two kinds are even mutually beneficial. This article focuses mostly on immersive VR. Figure 1 shows the virtual reality[1].

Figure 1: The above figure shows about the Virtual reality [learn].

Currently, typical virtual reality systems produce realistic pictures, sounds, and other sensations that mimic a user's physical presence in a virtual world using virtual reality headsets or multi-projected environments. A person using virtual reality gear may gaze around the virtual environment, move about in it, and interact with virtual features or objects. VR headsets with a tiny screen in front of the eyes are frequently used to get this effect, but it may also be achieved in specially built rooms with numerous big displays. Virtual reality usually includes audio and visual feedback, but haptic technology may also enable additional kinds of sensory and physical input[2].

For a long time, virtual reality teaching and learning applications have been a focus of academic research. Significant progress has been achieved in the last five years, and virtual reality technology is becoming more integrated into education. This article provides an overview of virtual reality's applications in education, focusing on the Oculus Rift platform. The purpose of this research is to look at how virtual reality may be used in learning and teaching. The findings of this study explain how content is delivered in applications of virtual reality and which the best educational virtual reality applications for users are [3]. While VR has come to the attention of the public since the 1980s, the VR headsets have seen so much sales growth over the last decade. New hardware is now available on the consumer market, which provides competitive price models but also fully develops and develops new technology. The roots of modern virtual reality can be traced back to 2012 when an Oculus Rift Kickstarter project was launched in order to bring a high-quality cost-effective head-mounted (HMD) display to the public. The Oculus Rift's preproduction process included multiple models that gave developers the opportunity to build applications before official launch. The new edition of Oculus Rift S is fitted with an LCD monitor with a resolution of 2560 per 1440[4].

This analysis offers a timely overviews of the present state of research on the virtual and increased reality of tourism via its mapping of what is understood[5]. The following aims have been achieved in the systematic quantitative literary study of papers published in tourism and hospitality journals. First is for identifying the sectors and contexts of tourism that have emerged from VR and AR research, second is for identifying types of VR and AR that have received the maximum attention in tourism research, third one is a summary of the emerging opportunities

and challenges of tourism change for R&D is taken from the results of the study. With the growing emphasis on VR technologies, a range of detailed overviews of VR applications for education and systematic mappings already exist (Jensen and Konradsen). Merchant and others for example, concentrate on VR desktops in education, whereas Jensen and Konrad Sen stress the use of HMD technologies. Jensen and Konradsen have a common emphasis in learning and performance; these aren't unique to their target audience which includes higher education, job training, vocational training or K12. In addition, these two studies does not discuss basic theories for the creation of VR applications and the elements used in designing of VR applications. Figure 2 shows the flow of review process.

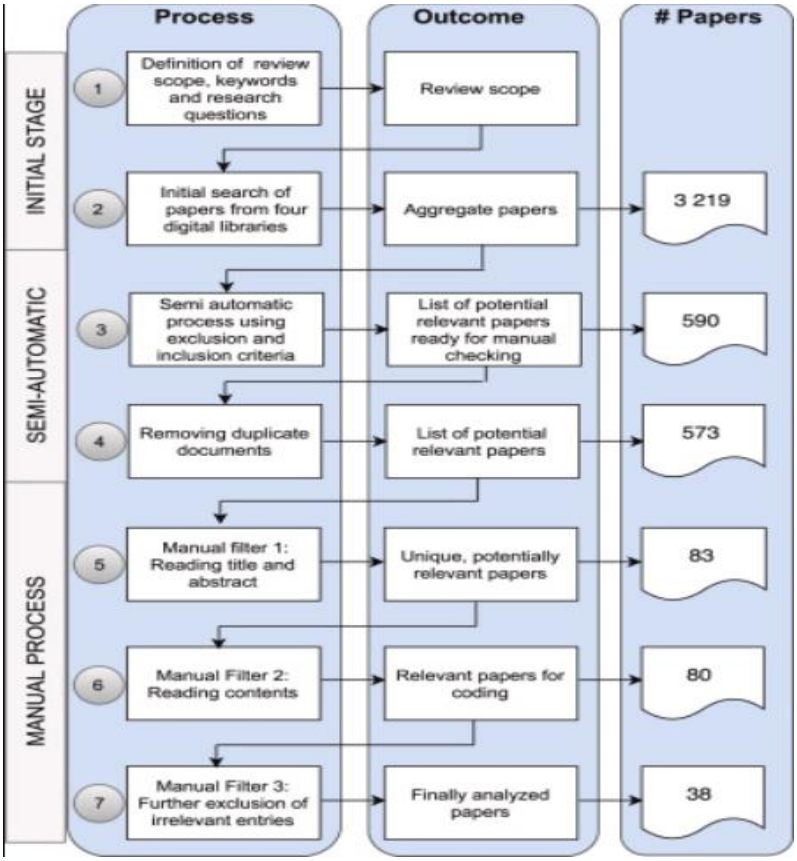

Figure 2:The above figure shows the flow of review process.

The growing reality is a technology more recent than the VR and demonstrates an interdisciplinary system of implementation, in which education and education now tend to be the most research area[6]. In reality, AR promotes learning, e.g. improving material comprehension and maintaining memory and encouraging learning. However if VR takes advantage of simpler and more detailed application and analysis areas, AR continues to evolve in scientific scenarios[7].

1.1 Virtual Reality Hardware:

A variety of devices is utilised to give consumers with an immersive, high-fidelity VR experience. Given the significance of sight in our interactions with the environment, we propose combining a display system that displays pictures in such a manner that the user believes them to be 3D (as opposed to viewing a 2D projection of a 3D scene on a conventional TV or computer screening). combined with a head tracking system considered as the least possiblerequirements sets for experiencing a highly immersive VR experience[8]. Almost all VR applications used this sort of hardware. Additional characteristics include input from movement capture, input from 3D control systems, haptic feedback, input from voice control, olfactory, burning, facial

recognition, audio and/or audio recording. The peripheral capabilities lists these features. Consider a VR experience designed for testingeasiness of a product assembly to help you recognize how peripheral and core capabilities are used collectively to construct more convincing experience[9]. The monitoring of a VR experience from different angles could include only core VR capacities. However if the experience is combined with haptic feedback and 3D input devices, it becomes interactive, and the user may try to build the product in virtual reality during interference and collisions. In comparison, it would probably be hard to change this particular experience to add an olfactory display to create virtual smell.

1.1.1 Display:

The display generally is at the heart of VR experience and is first option when any VR application is built. VR displays vary from regular displays, since a different image can be viewed in each eye. This capability to view individual images in every eye allow slightly offset images to be reflected in each eye sameas the physical world. The consumer gets the idea of seeing a real 3D scene when the virtual world is viewed as such. Although technology has been in place since at least the 1960s, historically, the experience has been prohibitively costly, unmanageable or of poor quality. VR displays typically fall into a single group: CAVE or head mounted displays Automatic virtual experience (HMDs).

1.1.2 Cave Automatic Virtual Experience:

It appears that CAVE technology was first researched at Illinois University's Electronic Visualization Lab. For its entire construction, the CAVE comprises of a space where all 4 walls, ceiling and floor consist of projection screens, a special set of glazing synchronized to the stereoscopic images projectors and a device used to feel and report the site and the viewers' eyes, as well as a computer trained in the measurement and display of the scenes and the projectionists. CAVE technology was first shown to be superior to other usable stereoscopic displays in most respects. These statements included greater field of view (FOV), enhanced visual acuity and improved collaboration support. Although many of these statements have been valid at the time, HMDs approach and compete with CAVE technology capabilities.

1.1.3 Exclusion and inclusion method:

The use of KH Coder 3 was intended to extract articles' collections into word clusters rather than to carry out full machine linguistic content analysis. The tool offers Term Extract, which automates the extraction of word clusters, which often take place with one another – for example, 'virtual space navigation.' The same term could occur, or accidental, clustering in two clusters, like "virtual space" and "navigation.' Each word cluster was therefore entered and the highest scoring clusters were therefore considered to be reliable[10]. This method varies completely from simply extracting a frequency word list in which every extracted word is listed depending on its occurrence frequency. In the procedure, a list of word clusters has beenreturnedwith scores and have selected manually the 1,000 most significant words and clusters which were obtained as a result of this process. This led to a reduced collection, during the subsequent manual process, of potentially relevant objects, which must be classified as "relevant" and not relevant."

1.2 Virtual Reality's Advantages:

1.2.1 Assists with Impressive Visualization:

Virtual reality's brilliance is undeniable. It aids in the discovery of different information and may even change the degree of difficulty. You may get the highest quality visuals if you use a VR headset. Allows Students to Engage — Conducting classroom interaction sessions has grown challenging for instructors in recent years. Interaction with students has been much easier with

the advent of Virtual Reality technology. The pupils to talk about their own experiences use virtual reality.

1.2.2 Creating Interest:

Virtual Reality has made watching rather than reading more pleasurable. The technological aspects of virtual reality are fascinating and intriguing. Virtual reality technology provides pleasurable experiences. This technology encourages kids to study more and get a better understanding of life.

1.2.3 Increases Educational Value:

Doctors use virtual reality technology to learn about new medical characteristics. Virtual reality also excels in the areas of editing and content creation. It aids in the detection of content errors. Some software configurations are recommended for defect detection. VR technology also aids in the creation of ideal editing choices.

1.2.4 Assistsin the Overcoming of Language Barriers:

Language barriers are a major issue in education. If you are not studying in your hometown, you must learn the local dialect of the location you are contemplating. The employment of appropriate software in conjunction with the installation of Virtual Reality allows for the proper implementation of any conceivable language.

1.3 Virtual Reality's Drawbacks:

1.3.1 Lacks Flexibility:

You can be more flexible in the classroom. You are willing to provide recommendations and ask questions. Virtual reality makes this impossible. You may use the same application in all of your sessions with the virtual reality headset. Positive interaction is not possible.

1.3.2 IneffectiveHuman Interactions:

Virtual Reality has a number of drawbacks. The traditional educational system is mostly focused on interpersonal relationships and individual human communication levels. Virtual Reality is an entirely new idea. It is just you and the program here.

1.3.3 BecomingAddicted:

Virtual Reality addiction is very prevalent. The virtual environment has the potential to become addictive to pupils. A segment of the population is becoming hooked to video games and other forms of entertainment. One may even get addicted to dangerous substances in the virtual reality environment.

2. DISCUSSION

A variety of studies have been carried out in education and training on the uses and usefulness of virtual reality. McLellan presents a comprehensive overview of literature related to the study and use for education and training of virtual reality. Ducan, Miller and Jiang identified the benefits of virtual environments as a la for collaborative work, entertainment and socialization in teaching and learning. However it was stressed that it should not be in the interests of any social, minority or disability groups that virtual worlds are used for learning. The digital library of Scopus has published between 59 peer-reviewed articles in the study titles “virtual reality” and “systematic review,” which relate to education, training, teaching or learning, in our research into current systematic reviews and VR mapping studies in an educational context. Neuroscience (11 percent), social sciences (15 percent), psychology and Medicine (78 percent) were the most common fields covered by these systems assessments (11 percent). By analyzing the abstracts of the reports, we further filtered the search results for the element of the immersion. 18 papers, of

which four were highly important, were listed and the findings of a systematic mapping analysis were presented. Furthermore, we found two other related posts, one describing a summary and one describing a Meta analysis. Therefore, we discuss six review articles altogether and present them briefly to highlight our structural mapping study's research void. Increased student interest and enthusiasm for learning were motivated by the incorporation of virtual reality into the curriculum[5] have created virtual reality software, in which students work together to 710visualize a transformer which is installed in a substation and operation and maintaining of virtual environment.

Gilbert identified the popular abstraction of science topics by students that require a deep understanding and ability to visualize. Visualization technology, such as virtual reality, can help students better comprehend the issue of misunderstanding. Virtual worlds are described as permanent, 24/7-open virtual environments that allow avatar representatives to develop, play and interact in real time (representation in 3D form). There was a mistake. Second Life is an online virtual world where avatars may socialize, communicate, and create their personal virtual places. Huang et al.in present timeis one among the most active virtual world sites. Second Life has 36 million residents and over one million monthly active users (Linden Lab). In ten years, transactions in the virtual global economy totaled USD 3.2 billion. In addition to virtual worlds like STA, Hyatt,Starwood and Crowne, the increasing success of virtual worlds hasn't been overlooked in tourism with Serbia, Maldives, Kazakhstan, Estonia, Sweden and Italy.

3. CONCLUSION

Virtual reality presents the education industry with both challenges and opportunities. The advantages of VR technologies are completely controllable, functional and safe as education and training tools. With the advancement of 3D simulation technology, a growing variety of teaching and education materials can be used in the world of virtual reality. Theresearch offers asummary of applications of VR on the Oculus Rift Platform for education and training. The results of the research show that medicine, space, history and nature dominate the delivery of curriculum material in virtual reality applications. More than 50% of applications are freely available without any cost in the majority of apps using English as a communication language.

For each educational application, we gathered information on the average user's star rating and the no. of reviews. Based on user ratings, we computed a Bayesian average from the data and ranked the top 10 educational virtual reality applications. Some studies show that the use of IVR systems in healthcare is still limitable in simulation disease. This is a continuous field of research in the IVR community, and potential changes to IVR's device architecture are likely to enhance IVR technology's usability with the general population. In the meantime, this study stresses the need to establish and enforce best practice recommendations for system IVR. In addition, IVR systems do not accommodate all demographics – a significant concern for health applications. IVR technology may however be customized to the needs of particular groups including people with blind or low vision. The development of an IVR-specific professional contracting company is a positive move in this direction. To this end, the technical and clinical team members need to be closely aligned to optimize the effectiveness of any new or proposed method.

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THE BRIEF REVIEW ON THE HARMONICS IN ELECTRICAL CIRCUIT

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ABSTRACT

As every industry becomes increasingly internationalized, the quality of energy has been changing year after year. Because technology is now going towards digital, electrical equipment is in lesser demand than digital equipment. Engineers, on the other hand, are attracted to electrical disturbances or harmonics. Harmonics may reduce or affect electrical network efficiency; therefore power engineers are concerned with harmonics and harmonic reduction methods. The use of power electronics, which is also responsible for harmonic production, has increased the number of power system applications in daily life. There are two kinds of loads in an electrical circuit: nonlinear and linear. Nonlinear loads cause zero sequence current, also known as harmonics current, which is produced in the neutral conductor and may disturb the circuit's waveform by affecting the voltage and current levels. Harmonics are a serious problem that may be solved by using the right filters and voltage current ratings. Many components of the electrical network use filters, such as LC filters, to neutralize zero sequence harmonics and certain other harmonics present in the system, increasing power factor rating. Harmonic distortion is discussed in this article, as well as techniques for minimizing it.

KEYWORDS: *Power System, Power Electronics, Harmonics, Filter, LC Filter, Power, Voltage, Current, Linear and Nonlinear Load.*

1. INTRODUCTION

Harmonics in power systems, especially in AC, are mostly produced by a fast increase in non-linear loads, which is caused by specific devices, such as variable frequency drives, that change their value when a circuit disruption occurs [1]. This is due to advances in technology, such as the use of power electronics circuits and gadgets. The usage of digital technology, as everything becomes digital, causes these harmonics problems [2]. Electronics such as microprocessors, microcontrollers, and arduino are accountable for generating output fluctuation due to the highly sensitive nature of nature. A power system containing power electronics components regulates AC/DC transmission links or loads, whether heavy or light, resulting in overall harmonics in the

system. Figure 1 depicts the different kinds of active power filters. Harmonics are classified into three groups.

- Control device
- Domestic load
- Industrial load

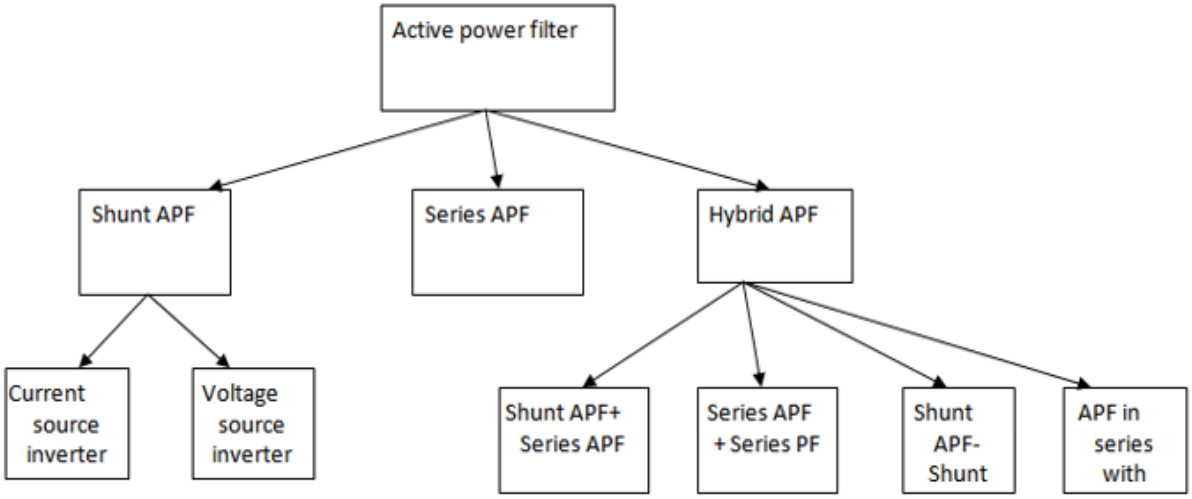

Figure 1: The Various Types of Filter for the Active Power.

Harmonics cases due to non linear load and non linear load is produced due to none obeying the ohm's law, when harmonics current or voltage it has distorted waveform so a compensator used to minimize or normalize the effect of non sinusoidal wave on it. A compensator can be comes in use only when all the component of the electrical circuit able to work accurately and have connection between the loads.

1.1.Measurement of Harmonics:

Measurement of harmonics of a circuit is by harmonics analyzer or digital storage oscilloscope. Oscilloscope is of two types analog and digital so it is used to measure the amount of distortion in the sinusoidal wave. Each harmonic frequency (f_n) is given by the equation $f_n = n \bullet f_1$ where n is the harmonic number and f_1 is the frequency of the first harmonic[3].

1.2.Effects of Harmonics:

Harmonics can affect any electrical and electronics device because sudden rise in current may lead to heating problems and low voltage can cause speed problems in the device also increase in voltage leads to the insulation failure[4].

Effect of harmonics on transformer also transformer is a static device used to convert voltage from lower to higher or from higher to lower named as step up transformer and step down transformer, transformer is a nonlinear device means it does change its resistive value when voltage starts fluctuating[5]. Major effect of the harmonics on the transformer is the heat losses, and that heat loss is additional loss caused by the harmonics current[6].

Some more problems associated in transformers due to harmonics like resonance between transformer inductance and system insulation, capacitance, mechanical insulation and stresses

due to core of transformer (iron core) vibration and temperature rise[7]. In transformers various types of losses present in which heat loss, iron loss, copper loss, hysteresis loss and humming loss present, these losses can induce due to harmonics, means due to harmonics eddy current loss in the transformer increases due to which efficiency of the transformer decreases[8].

Harmonics for any circuit is the amount of unwanted rise in frequency wave which is superimposed on the input wave and distort it which causes many equipment failure and losses in the electrical circuit. Harmonics can be find out by n*f where f is the fundamental frequency of India (50Hz)[9].Figure2 shows the Harmonics waveform having fundamental. 5th, 6th, 7th and total harmonic.

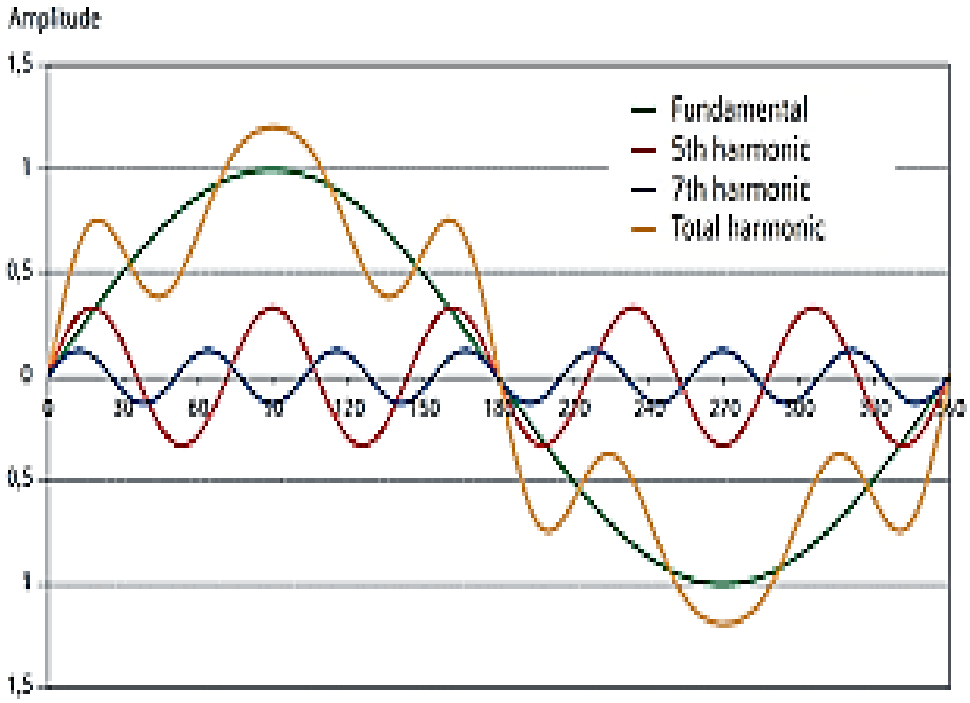

Figure2: The Harmonics Waveform Having Fundamental. 5th, 6th .7th And Total Harmonic

Every equipment is sufficient for producing a signal that will produce even/ODD harmonics some of the equipment produced either ODD or EVEN harmonics.Figure 3 shows the harmonics formation for the 5th, 6th .7th and total harmonic having fundamental sine wave and square wave component.

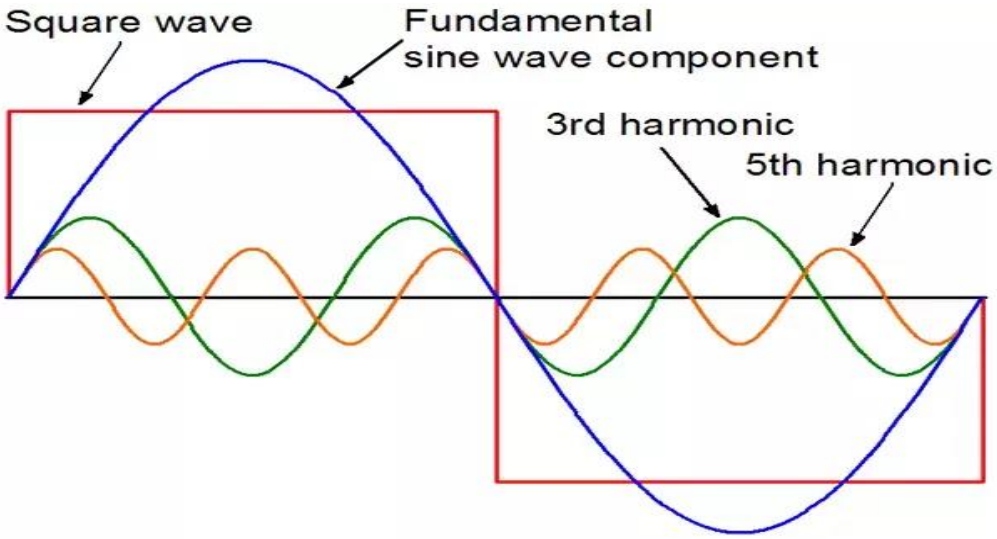

Figure 3: The Harmonics Formation for5th, 6th .7th and Total Harmonic.

Usually Both linear and non-linear loads are extensively used in every electrical load scenario. Throughout the applied voltage cycle, the impedance of a linear load stays constant. Resistive, inductive, and capacitive loads are examples of linear loads. In contrast, a non-linear load is defined as one whose impedance changes constantly with the applied voltage cycle. SMPS, electrical equipment, Selective catalytic reduction devices, UPS systems, and other non-linear devices are examples.

Harmonics, on the other hand, are distortions of a normal electrical current waveform that are often transmitted via non-linear loads that draw a sub sinusoidal signal from a sine voltage source. Harmonic current reduces efficiency and increases heat losses in the power system. Harmonic currents have the potential to cause significant damage to electrical distribution networks and the facilities they service.

Switch-mode power supplies (SMPS), variable-speed actuators and drives, copy machines, computers, LaserJet, fax machines, battery chargers, and UPSs are examples of nonlinear loads. Single-phase non-linear loads are prevalent in modern office buildings, while three-phase quasi loads are frequent in factories and industrial facilities. Harmonics are not to be confused with spikes, dips, surges, oscillation, or other kinds of hobos. Figure 4 depicts the harmonics generation for the 5th, 6th, and 7th harmonics, as well as the resulting fundamental sine wave component.

All computer systems need SMPSs for internal circuits, which convert utility AC power to regulated low-voltage DC. These non-linear power sources drain current in short, high-amplitude pulses, producing significant harmonic distortion in the electrical current and voltage waveforms (total harmonic distortion) (THD). The distortion is reflected back into the power source, putting other devices on the same supply at risk. Many power systems can tolerate a certain amount of harmonic current, but problems emerge when harmonics account for a significant portion of the overall load.

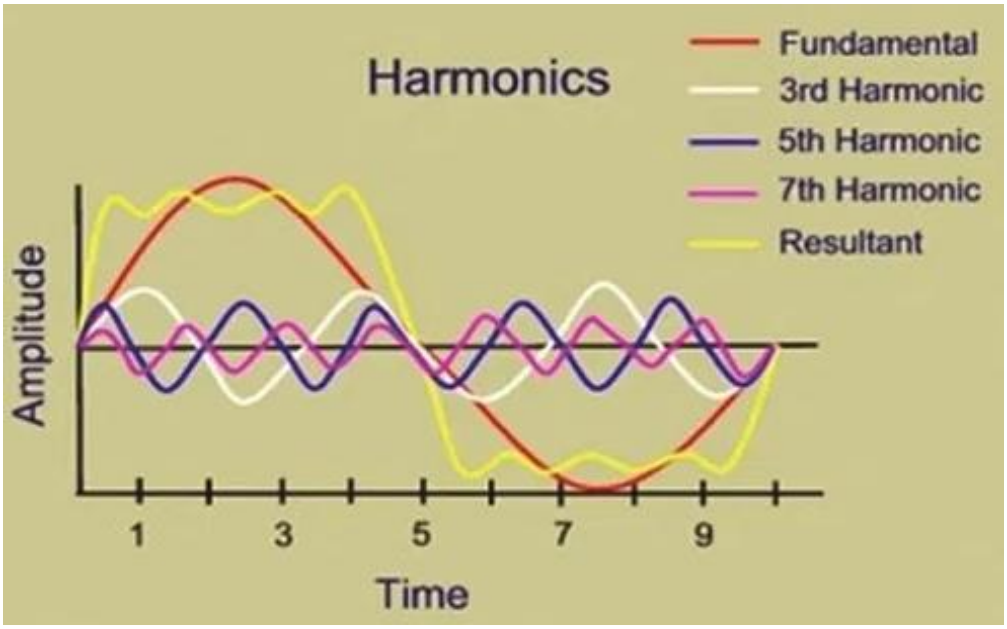

Figure 4:the Harmonics formation for the 5th, 6th .7th and Resultant Having Fundamental Sine Wave Component.

LITERATURE REVIEW

Many papers have been published in the field of harmonics, and research is still ongoing to reduce harmonic distortion and improve circuit efficiency. Among the many research papers, one titled "harmonics in power system and its mitigation technique" by A.J. Mehta and K.L. Mokariya discussed harmonics, their causes, and how to prevent them. LC circuits are most often employed in electrical networks to decrease harmonics and boost power factor. There are two kinds of techniques for normalizing harmonics in a circuit: active filtering and passive filtering, harmonics' effects on transformers and other devices, and harmonics' impacts on load. MATLAB simulation of an electrical circuit to identify voltage and current waveform behavior. Harmonics have an impact on the load and the device, causing load rupture (abnormal operation), insulation stress (voltage effects), and thermal stress (current effect). This study also shows the design of active and passive filters, as well as the analysis of a single frequency tuned filter for the fifth, as well as the current waveform with filter [10].

Ritesh Dash, Aradhana Pradhan, Manas Ranjan Sarang, and Pratik RanjanBeherad wrote a case study titled Fundamental of Harmonics and Their Effect on the Power System. In this paper, they discussed the concept of fourier transform and how it can help to reduce harmonics, as well as MATLAB simulations of different types of loads such as linear, inductive, and capacitive loads. A linear load transforms all of its electrical energy into another kind of energy; it has 100 percent active power and zero percent reactive power. The generation of harmonics is never caused by a linear load. The basics of harmonics were also addressed in this article [11].

DISCUSSION

The topic of this article is Harmonics in power systems, particularly in AC, are mostly generated by a rapid rise in non-linear loads, which is caused by specialized devices, such as variable frequency drives, that alter their value when a circuit is disrupted. This is owing to technological advancements including the usage of power electronics circuits and devices. These harmonics

problems are caused by the use of digital technology, which is becoming more prevalent as everything becomes digital. Due to the extremely sensitive nature of nature, electronics such as microprocessors, microcontrollers, and arduino are responsible for producing output fluctuation.

When current and voltage waveforms deform, harmonics is the amount of energy wasted. Harmonic effects may occur when large amounts of power electronics equipment are used, especially in digital equipment with switched mode power supplies. The higher-to-lower-rated transmission line is intended to handle these types of distortion currents caused by harmonics, short circuit effects, and other factors. To minimize the harmonics impact in a circuit, engineers employ LC filters to provide reactive power to the circuit, while filters like active and passive filters are used to display the system's enhanced output.

Switch-mode power supplies (SMPS), variable-speed actuators and drives, copy machines, computers, LaserJet, fax machines, battery chargers, and UPSs are examples of nonlinear loads. Single-phase non-linear loads are prevalent in modern office buildings, while three-phase quasi loads are frequent in factories and industrial facilities. Harmonics are not to be confused with spikes, dips, surges, oscillation, or other kinds of hobos. Figure 4 depicts the harmonics generation for the 5th, 6th, and 7th harmonics, as well as the consequent with a fundamental sine wave component.

CONCLUSION

Harmonics in the power system are caused by nonlinear loads that change their resistive value as the voltage changes. Nonlinear equipment used in electrical circuits, such as variable frequency drives, may also generate harmonics. Because there is no fluctuation in resistance when voltage is adjusted, linear loads contain only active power and no reactive power. Any circuit's active power is the altered form of electrical energy, such as light or heat energy, thus active power is the amount of energy utilized by the circuit, while reactive power is the amount of energy transferred through the circuit or returned energy. When current and voltage waveforms deform, harmonics is the amount of energy wasted. Harmonic effects may occur when large amounts of power electronics equipment are used, especially in digital equipment with switched mode power supplies. The higher-to-lower-rated transmission line is intended to handle these types of distortion currents caused by harmonics, short circuit effects, and other factors. To minimize the harmonics impact in a circuit, engineers employ LC filters to provide reactive power to the circuit, while filters like active and passive filters are used to display the system's enhanced output.

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INTERNET OF THINGS (IOT): A REVIEW

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ABSTRACT

The Internet, a groundbreaking innovation, is constantly evolving into new technology and applications, making it impossible to ignore. We now observe human-human or human-device communication, but the Internet of Things (IoT) promises a bright future for the internet in which communication is machine-machine (M2M). This article seeks to offer a thorough overview of the Internet of Things (IoT) scenario, as well as a discussion of the supporting technologies and sensor networks. It also outlines a six-layered IoT architecture as well as the associated major issues. The basic idea behind the Internet of Things is to enable the autonomous exchange of useful information between invisibly embedded different uniquely identifiable real world devices around us, fueled by cutting-edge technologies such as Radio-Frequency Identification (RFID) and Wireless Sensor Networks (WSNs), which are sensed by sensor devices and further processed for decision making, on the basis of which an automated action is taken.

KEYWORDS: *Internet of Things, Iot Applications, IOT Architecture, Iot Security, Iot Vision.*

39. INTRODUCTION

With ongoing technological developments, the Internet of Things (IoT) is on the horizon, blossoming as a pervasive global computer network where everyone and everything will be connected to the Internet. The Internet of Things (IoT) is a hot research topic with limitless possibilities. It is on the verge of reshaping the current form of the internet into a modified and integrated version due to its limitless imagination[1], [2]. The number of gadgets that use the internet is growing by the day, and having them all linked, whether by wire or wireless, will provide us with a strong supply of information at our fingertips. The notion of allowing sentient devices to communicate is cutting-edge technology, but the technologies that make up the Internet of Things are not new to humans. The Internet of Items (IoT) is a method of merging

data collected from many types of things to any virtual platform using existing Internet infrastructure, as the name suggests.

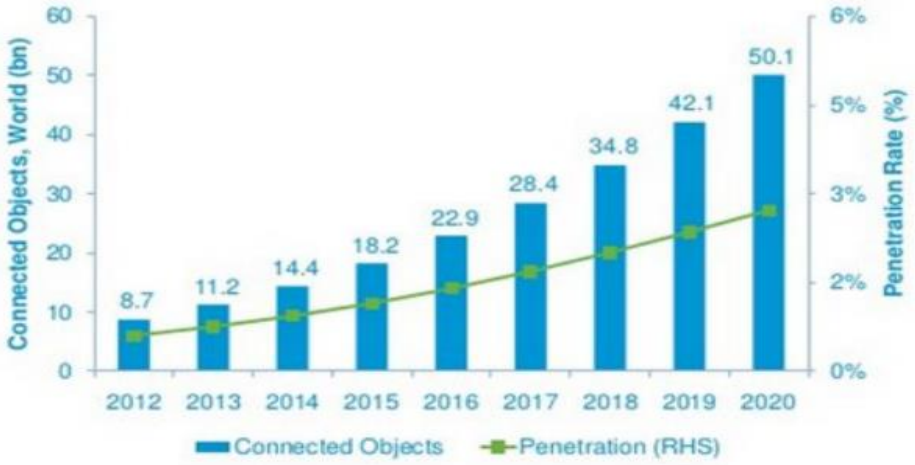

Fig. 1. Expected penetration of connected objects by the year 2020, according to Cisco [3]**.**

The Internet of Things (IoT) was first introduced in 1982, when a modified coke machine was connected to the Internet and was able to report the number of beverages it held and if they were cold[4]. Mark Weiser presented the first current concept of IoT in the form of ubiquitous computing in 1991. Bill Joy, on the other hand, included a clue regarding Device to Device communication in his internet taxonomy in 1999. Kevin Ashton coined the phrase "Internet of Things" to describe a network of interconnected gadgets the same year. Fig 1 illustrates the penetration of connected objects by the year 2020.

40. DISCUSSION

40.1. Architecture:

By 2020, more than 25 billion things are expected to be connected, which is a huge number. As a result, the existing Internet architecture with TCP/IP protocols, which was adopted in 1980, will be unable to handle a network as large as IoT, necessitating the development of a new open architecture that can address various security and Quality of Service (QoS) issues as well as support existing network applications using open sourced software[5].Many people are unlikely to embrace IoT unless it comes with adequate privacy protection. As a result, data security and user privacy are major concerns for IoT.

A variety of multi-layered security designs are suggested for IoT development. W. Chen proposed a three-level IoT design, whereas Suo et al. proposed a four-level architecture[6], [7]. Wu et al. suggested a five-layered architecture based on TCP/IP and TMN models that combines the best characteristics of Internet and Telecommunication management network designs. A six-layered design based on the network hierarchical structure was also suggested [8]. As illustrated in Fig. 2, it is usually split into six levels.

The six levels of the Internet of Things are outlined below:

i. Coding Layer:

The basis of IoT is the coding layer, which identifies the items of interest. Each item is given a unique ID in this layer, making it simple to distinguish between them.

ii. Perception Layer:

This is the IoT device layer, which gives each item a physical meaning. It is made up of data sensors in many forms such as RFID tags, infrared sensors, and other sensor networks that can

detect the temperature, humidity, speed, and position of things. This layer collects valuable information about objects from the sensor devices that are connected to them and transforms it into digital signals, which are then sent on to the Network Layer for further processing.

iii. Network Layer:

This layer's function is to receive valuable data in the form of digital signals from the Perception Layer and send it to the Middleware Layer's processing systems through transmission mediums such as WiFi, Bluetooth, WiMaX, Zigbee, GSM, 3G, and protocols such as IPv4, IPv6, DDS, and MQTT.

iv. Middleware Layer:

The data from the sensor devices is processed by this layer. It comprises technologies such as Cloud computing and Ubiquitous computing, which allow for immediate access to the database and the storage of all required data. The information is processed using Intelligent Processing Equipment, and a completely automated action is performed depending on the processed outcomes of the information.

v. Application Layer:

Based on the analyzed data, this layer enables IoT applications for various types of industries. This layer is extremely useful in the wide scale growth of IoT network because apps encourage the development of IoT. Smart homes, smart transportation, smart planet, and other IoT-related applications are possible.

vi. Business Layer:

This layer is in charge of managing IoT applications and services, as well as any IoT research. It produces several business models that may be used to develop successful company strategies.

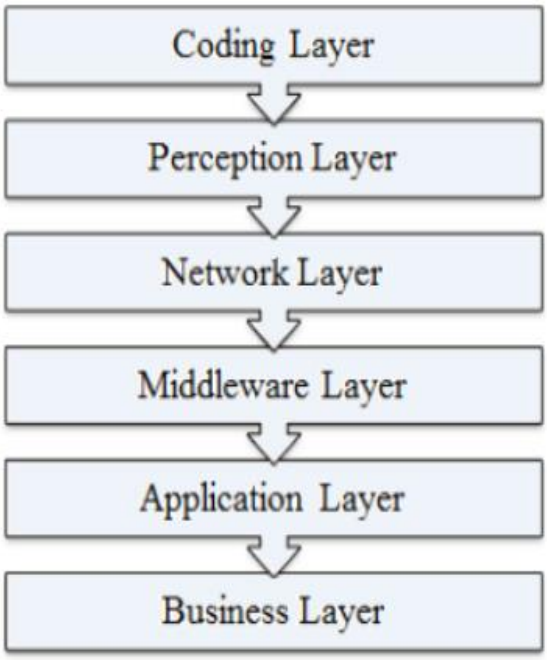

Fig. 2: Six-Layered Architecture of IoT[9]**.**

40.2. Technologies:

The development of a ubiquitous computing system in which digital objects can be uniquely identified and can think and interact with other objects to collect data on which automated actions are taken necessitates the use of a combination of new and effective technologies, which

can only be achieved through the integration of different technologies that can make the objects to be ide. In this part, we'll go through some of the technologies that may assist with IoT development on a big scale.

40.2.1. Radio Frequency Identification (RFID):

RFID is the technology that allows things to be uniquely identified. It may be integrated into any item because to its small size and low cost. It's a transmitter microchip that looks like an adhesive sticker, and it may be active or passive depending on the application[10]. Because active tags contain a battery, they are constantly active and therefore continually transmit data signals, while passive tags are only engaged when they are triggered. Active tags are more expensive than passive tags, but they offer a far wider variety of uses. The RFID system consists of readers and associated RFID tags that, when activated by the production of any suitable signal, emit the object's identity, position, or other details. The generated object-related data signals are sent to the Readers through radio frequencies, where they are subsequently analyzed by the processors shown in Fig.3.

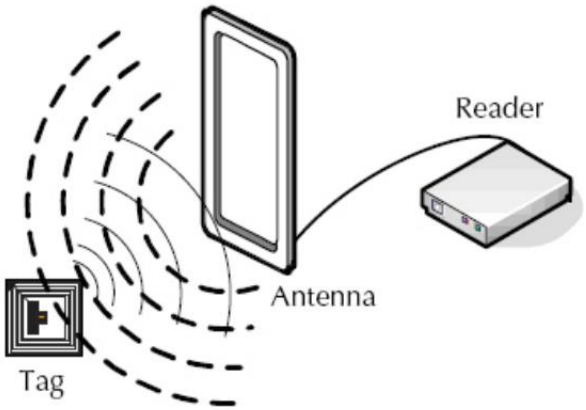

Fig. 3: RFID Scenario

40.2.2. Wireless Sensor Network (WSN):

WSN is a multi-hop bi-directional wirelessly linked network of sensors made up of many nodes distributed across a sensor field, each connected to one or more sensors that may gather object-specific data such as temperature, humidity, and speed and then send it on to processing equipment[11]. Multi-hop communication is used by the sensing nodes. Each sensor is a transceiver with an antenna, a microcontroller, and an interface circuit that serves as a communication, actuation, and sensing unit for the sensors, as well as a power supply that may be a battery or other energy harvesting device. However, some researchers have suggested a Memory Unit, which may be a component of the sensing node, as an extra unit for storing data. Fig. 4 depicts an example of a sensing node.

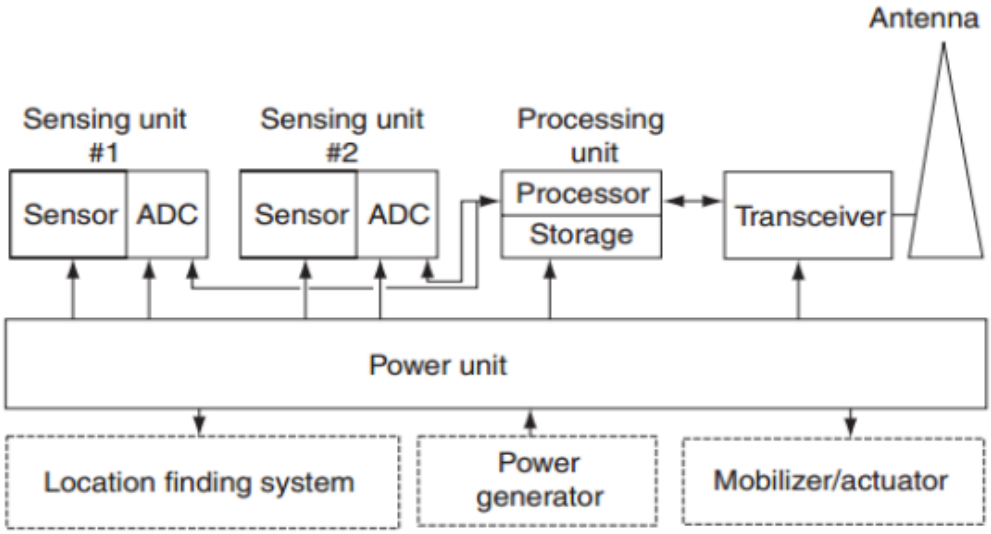

Fig. 4: A typical sensing node

40.2.3. Cloud Computing:

With millions of devices anticipated by 2020, the cloud seems to be the only technology capable of efficiently analyzing and storing all of the data. It is an intelligent computing technique in which a large number of servers are converged on a single cloud platform to enable resource sharing and access at any time and from any location. The most essential aspect of IoT is cloud computing, which not only converges servers but also processes and analyzes the relevant information received from sensors, as well as providing enough storage capacity. However, this is just the beginning of this technology's full potential. Cloud computing combined with smart devices with possibly millions of sensors may provide tremendous advantages and aid IoT growth on a big scale, thus research is underway since IoT will be completely reliant on Cloud Computing shown in Fig.5.

Fig. 5: A typical Cloud Computing Scenario.

40.2.4. Networking Technologies:

Because these technologies are responsible for connecting things, they are critical to the success of IoT. We need a fast and effective network to manage a huge number of potential devices. We

commonly use 3G, 4G, and other wide-range transmission networks, but as we all know, mobile traffic is very predictable because it only has to perform basic tasks like making a call, sending a text message, and so on. As we move into the modern era of ubiquitous computing, however, it will no longer be predictable, necessitating the development of a super-fast, super-efficient fifth generation wireless system. Similarly, we utilize technologies such as Bluetooth, WiFi, and others for a short-range communication network.

40.2.5. Nano Technologies:

This technology allows for the creation of smaller and better versions of linked objects. It may reduce a system's consumption by allowing the creation of nanometer-scale devices that can function as sensors and actuators in the same way that conventional devices do. The network created by such a nano device, which is made up of nano components, establishes a new networking paradigm known as the Internet of Nano-Things.

40.2.6. Optical Technologies:

Rapid advancements in the area of optical technologies, such as Li-Fi and Cisco's BiDi optical technology may represent a big step forward in the development of IoT. Li-Fi, an epoch-making Visible Light Communication (VLC) technology, will offer excellent connection and greater bandwidth for IoT-connected devices. Bi-Directional (BiDi) technology, on the other hand, provides a 40G Ethernet for large data from a variety of IoT devices.

40.3. Applications:

Most of the everyday apps we encounter are already intelligent, but they are unable to interact with one another, and allowing them to converse and exchange valuable information will result in a broad variety of new applications. These new apps, which have some self-driving capabilities, would undoubtedly enhance the quality of our lives. A handful of these applications are already on the market; for example, the Google Vehicle is a project to offer a self-driving car experience with real-time traffic, road conditions, weather, and other data exchanges, all thanks to the Internet of Things idea. There are a lot of potential future uses that may be very beneficial. We'll go through a couple of them in this section.

- Smart Traffic System
- Smart Environment
- Smart Home
- Smart Hospitals
- Smart Agriculture
- Smart Retailing and Supply-chain Management

40.4. Security and Privacy Challenges:

IoT makes everything and everyone accessible and locatable, making our lives more simpler than before; but, without trust in the security and privacy of the user's data, it's unlikely to be widely embraced. As a result, IoT need a robust security architecture in order to gain widespread acceptance. The following are some of the potential IoT-related issues:

- Unauthorized Access to RFID
- Sensor-Nodes Security Breach
- Cloud Computing Abuse

41. CONCLUSION

The idea of the Internet of Things will soon be inexorably growing on a massive scale, thanks to the constant emergence of new IoT technologies. By embedding intelligence into the things around us, this new networking paradigm will impact every aspect of our lives, from automated homes to smart health and environment monitoring. We explored the IoT concept and provided a well-defined architecture for its implementation in this paper. Then we went through some of the enabling technologies and a few of the security risks that go along with them. Finally, we reviewed a variety of IoT-related applications that are anticipated to help us in our everyday lives. Although studies are being conducted in order to broaden its acceptance, it is extremely improbable that it will become an omni-present technology until the difficulties in its development are addressed, as well as the user's privacy and security. The adoption of IoT necessitates concerted efforts to address and offer answers to the security and privacy concerns that it poses.

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PECULIARITIES OF LANGUAGE AND SPEECH RELATIONS

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ABSTRACT

Everything in a language is common to the language community. "Language has a spiritual and material material. Images of words, morphemes, phonemes in human memory are spiritual material. Word forms, morphemes, sounds that appear in a certain set of sounds (complex) in the process of speech formation are material material. This leads to the conclusion that language is a material phenomenon on the one hand, and a spiritual phenomenon on the other. The mental phenomenon of language is determined by its storage in the mind.

KEYWORDS: *Speech, Norm, Activity, Culture, Pronunciation, Phoneme Stress, Language Norm, Morpheme.*

INTRODUCTION

Language and speech are interrelated phenomena. It is unreasonable to separate them. Language is a material material for speech. Speech is formed on the basis of this material. We quickly (automatically) use the rules stored in our memory to form word forms and sentences from words and morphemes that carry grammatical meaning to express an idea. For example, let's say we have an idea of where he got the book from. We bring it up as a question: Where did you get the book? In doing so, we used the lexemes sen, kitab, kayer, ol: the morphemes ni, from, in, of and the question model and rule. In the process of saying this, the lexemes in our minds took on separate morphemes and became word forms, and took on the above order. Language went from a spiritual phenomenon to a material phenomenon. When this process is over, the things that belong to language return to a state of separation and remain in our minds as before. This means that words, phonemes, various linguistic rules, models of sentences, which are stored in the

minds of people in a certain language community as sound images and are always ready to become real, belong to the language. Things related to language are limited.[1]

Their number varies in different languages. The more languages there are, the richer the language. Language, which covers all spheres of community life, develops with the development of society. Elements of language that do not meet the needs of society will become obsolete, and new means of expression will appear in their place.

What appears in the language first appears in the speech of some individuals, and then gradually penetrates into the consciousness of the whole community. After that, when everyone understands and pronounces it the same, it becomes a language. Otherwise, it remains specific to the speech of the individual. For example, in the speech of some people who speak Uzbek, the word “designer” (a person doing something) has been used since 1986. It is not yet fully ingrained in the minds of Uzbek-speakers, nor does it have its own spelling and pronunciation. Therefore, it still belongs to the language of some individuals. The future will show that it will not remain typical of the Uzbek language.

Speech is an idea that has become a reality by using existing means of expression in language. Occurs during the movement of the organs of speech. The means of expression of language, which is a spiritual phenomenon, become reality when it is transferred to the will of speech.[2]

There are two types of speech: internal speech and external speech. Speech can also be formed in the human mind. In doing so, it consists of elements of language that have not yet been realized. This is an inner speech. The fact that people think, argue and think without opening their mouths is an example of internal speech.

The effect of the air from the lungs on the organs of speech, as a result of which the action of their speech occurs as clear sounds, is external speech. Speech is a moving language. Speech connects and moves things related to language in a certain period of time. Speech consists of word forms, free combinations, word order and sentences. When the speech process is over and the thought reaches the listener, the speech also ends. So, word forms, free word combinations, word order, different forms of speech belong to speech. Although the means of expression in language are limited, speech is infinite. Once the means of language are at the disposal of speech, an infinite number of sentences can be formed from them. Speech alone in the community; created by the person. The speech will be addressed to an individual or people in the community. So speech is a social phenomenon. It has the ability to unite people in society, to jump to a specific goal. Speech plays a decisive role in the development of society. There can be no human society without speech. All classes have equal access to language tools. But speech is not like that. It is formed in the interests of a particular class. So speech is a class phenomenon.

Language culture and speech culture: What is the culture of language? The culture of a language means its vocabulary, syntax development and level of enrichment, sharpness of word meanings, and variety of speech tone. The culture of speech is the sum and system of its communicative qualities, which depend on various conditions, such as language culture, ease of language activity, the semantic function and ability of the text.

Language culture consists of the richness and diversity of language tools and lives in the minds of users of this language. But the appropriation of this wealth: the level will be different for each member of the team. The more a person has mastered the means of language culture and turned them into his own speech process, the more civilized his speech will be. Since speech is the work of an individual, its culture also depends on the extent to which a person has mastered the possibilities of language and is able to use them skillfully in accordance with the conditions of speech. Acquisition of the linguistic potential of a language takes place in two stages. The first step is to know the language tools. This is seen in listening to the speech and understanding the

meaning and function of the language tools used in it. That is, the listener understands what he has heard and read. Such a person understands the speech of others well. But his speech is deprived of the various possibilities of language, it is poor. The second stage is to master most of the opportunities provided by the language system, to translate them into the speed of speech. The speech of the person who has achieved this, will be rich, figurative, and appropriate. Constant practice on the means of speech acquired in the first stage, constant attention to their memorization, turns these possibilities into speech speed.

Information about speech activity.

Human speech activity takes three forms. These are speaking, reading and listening. Speaking means giving information, giving advice, ordering, asking about things unknown to the speaker. When speaking, the knowledge, culture, morals and etiquette of the speaker are revealed. Speech can be monologue or dialogic. In a monologue, a person's comments appear without contradictory questions or answers, and are not shared by the interlocutor. In dialogic speech, the communicators are sometimes listeners and sometimes speakers.[3]

Reading is the student's communication with the author of the work, his reputation through written speech. As a result of reading, the student becomes aware of the events reflected in the written speech, under the influence of which there is a change in behavior. Reading is the most important way to get information. One achieves spiritual maturity through reading.

Reading consists of simple reading and scientific reading (underlining important things, copying passages, taking a brief synopsis, reading thoughtfully on the work). In normal reading, the goal is to get acquainted with the content of written speech for the student. In scientific reading, the student aims to analyze the work, to use it for another purpose, to retell its content.

Communication and speaking activities of a social worker: The teacher is responsible for the development of new social forces in society. Society entrusts the young generation, that is, its future, to the teacher. In its development are the means of determining the teacher's worldview, consciousness, culture, speech. The profession of social worker wants high culture, humanity, internationalism.

In teaching and educating students, the teacher’s speech is as important as his work. After all, a teacher does most of his professional work through speech. Therefore, his speech should always be ideologically high, fluent, soft and kind. Uncertainty in speech and work is unworthy of a teacher. Every speech must be structured to take into account the age characteristics, knowledge and understanding of the children. At the same time, the teacher's speech aims to reveal new aspects of the material and spiritual world that surrounds him in the eyes of the younger generation. The speech of a social worker is the basis of education and upbringing. The speech of a social worker should be as syntactically simple, attractive and effective as possible. Any knowledge and education is provided, mainly through the teacher's in-class and out-of-class speech. In speech, in any form, our values must be strictly respected. The peculiarity of pedagogical speech communication is characterized by the fact that the teacher is an educator everywhere, in any situation. The teacher spends more time with his students in the classroom, in class. His speech acquires a scientific pedagogical content. Such a speech reflects the rules, terms, conclusions specific to different areas of science. In such a speech, everything is in its place, in moderation. Explanations of terms, new words are given in simple, teacher-digested syntactic devices. Rules and theories are explained with vivid, reader-friendly examples.[4]

Oral and written forms of speech are their features. It is known that speech has both oral and written forms. Oral speech exists only in the unit of time in which the speaker speaks, and at the end of this process the speech also ends. However, the excitement aroused by the speech, the retention of the information in the mind of the listener for some time, can affect his behavior.

Features of oral speech include:

1. Oral speech is fast (automatic). Together with the concepts, the word "his dress" begins to appear "at lightning speed." Sometimes a word that expresses a concept cannot be found by the speaker at the same speed. Uses words that do not express a concept that is close to him or thought. As a result, the speech (speech, statements) does not hurt the full realization of the intended purpose (idea).

2. In oral speech, models of phrases and sentences are selected quickly in accordance with the intended idea. The construction of speech, the models are controlled by the mind. It is necessary to develop the idea by memorizing what is said. If the memory is a little "lazy", the structure of speech, phrases will not be logically and grammatically connected. Because the new part cannot adapt to it because the previous part is forgotten. For example, "Teacher, we are grateful for your great service to the people." In the example, the speaker forgot the previous part, the previously thought-out model, in the process of thinking about how to develop it after saying the part "Teacher, you". That is why the word in the consonant is not grammatically and logically connected with the following parts.

3. Oral speech is deprived of the ability to edit. It is addressed to the listener in the form in which it came into being.

4. In oral speech, usually only the most necessary things for communication appear. This is due to time savings, on the one hand, and the power of speech, on the other. Therefore, it is rare to have a long introduction and extensive comments. On the contrary, the degree of interdependence of events, things, the degree of their clarity to the listener and the speaker is taken into account. Only when necessary is something explained in advance.

5. Oral speech is much poorer in terms of vocabulary than written speech. In it the same words, the same forms are repeated a little more often. This is due to the difficulty of choosing language tools.

6. In oral speech, the active speech movement of the speaker is a pause, tone, emphasis, various gestures play an important role in the delivery of thought to the listener.

Written speech differs from oral speech by the following features: when writing a speech, the author is able to think freely in terms of time. He can re-edit parts of his speech and the whole speech, choose the most appropriate options for the idea, facilitate the structure of speech. That is why written speech is more fluent than oral speech.

People's speech activity takes the form of monologues, dialogues, polylogues.[5]

Monologue. A monologue is a speech addressed to the speaker or to the audience. In a monologue, the speaker gives information about the events that are known to him, about his inner experiences. Monologic speech does not encourage the audience to actively participate in the conversation; does not require them to respond to what is said. Syntactically, monologue speech is complex and comprehensive.

Monologic speech, depending on its characteristics, can take several forms: internal monologue and external monologue; there are types of external monologue such as dramatic monologue, lyrical monologue, message monologue.

Internal monologue is one of the methodological methods used in fiction. This method allows you to describe the actual events that took place as thoughts that appeared in the inner experiences of the protagonist under their influence. The inner monologue is the inner speech of the speaker.

Although the monologue is strict, this is not the case with lexical norms. Variation in words. Extremely rich than other language forms. Sometimes there are dozens of language options: di and all of them are normative. For example, from the synonyms such as face, face, face, in this combination, which is normative and which is out of the norm: light falls on the face, light falls on the face, light falls on the face. In our opinion, all three options were used appropriately. Probably in view of such cases, some experts say that the lexical norm in general. object to the designation of.

The above example shows that variability is also a phenomenon inherent in the literary norm. When using the lexical richness of the language, this possibility of the norm helps the author to overcome repetition, uniformity, to create a beautiful speech.

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IMPROVING THE CONTENT OF PHYSICS EDUCATION BASED ON THE FORMATION OF ELEMENTARY CONCEPTS OF SOLAR ENERGY IN THE CIRCLE

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ABSTRACT

The article presents a methodology for the formation of elementary concepts related to the conversion of solar energy into electricity in school physics circles. The article also describes the ability of students to master the basic concepts of the physical processes of solar energy based on the results of pedagogical experiments.

KEYWORDS: *Solar Energy, Multimedia Teaching Aids, Visual Aids And Handouts, Circle Work, Pedagogical Experiment, Science And Technology.*

INTRODUCTION

The Resolution of the President of the Republic of Uzbekistan "On measures to improve the quality of education and research in physics" dated March 19, 2021 sets tasks to further improve the quality of teaching physics and create new scientific and methodological developments, new scientific and educational literature [1]. There is a need to enrich the theoretical and practical lessons of physics, circles, optional courses, on the basis of new modern knowledge in the effective organization of independent work. A lot of practical work on the enrichment of physics classes on the basis of scientific and technical innovations is being implemented in the educational process.

In particular, many scientific and methodological manuals on modern energy technologies, new types of energy sources, and their use as sources of electricity and heat and methodological developments for their teaching are being developed. Methodological developments, textbooks and manuals have been created in this field by the scientists of the Republic S.Kakhkharov, H.Juraev, U.Abdiev and others [2-5]. Let us consider the possibilities of introducing students to the elementary concepts of the conversion of solar energy into electricity. In this regard, in this article we present a mathematical statistical analysis of the experimental work of the circle on the study of physical processes of solar energy, which is considered the most effective among renewable energy sources. Pedagogical experiments show that in most lesson processes, teachers conduct lessons according to establish (based on the technological map of the lesson) regulations. There are both positive and negative outcomes of these course processes, which may not be sufficient for students and learners to think freely throughout the entire course. It is

recognized by many pedagogical scientists that the modern requirement for the transfer of knowledge and concepts of science to students depends mainly on the organization of more free thinking, non-standard teaching processes.

As an example, we will analyze the following pedagogical experiment and its results, which were conducted using multimedia teaching aids in the lessons of the physics education circle of knowledge in the content of solar energy sources. In this pedagogical experiment, it is intended to organize the process of the circle as a non-standard lesson. The pedagogical experiment was conducted at the secondary school No.11 in Termez. The school has a training circle "Young Physicists", the members of which are 22 people. The members of the club are mainly 10th and 11th grade students, and the club has 2 classes a week. The sequence of topics outlined in the lesson plan is designed to explore innovations in the field of physics, prepare small models and exhibitions, and explore interesting topics and exercises. The selected circle for the pedagogical experiment was on the topic "Types of solar energy sources and opportunities for their use", and the members of the circle were trained twice on this selected topic.

The first organized circle exercise in the group was conducted in the usual, traditional way of testing. The second session included multimedia teaching aids, visual models, slides and crossword puzzles, and handouts with a variety of questions and exercises. In general, the theme of this second round is the same as the previous round, but this lesson was organized in a non-standard way. In this lesson, non-traditional teaching methods were used effectively, ie the following methods and techniques: "Discussion", "Brainstorming", "Question-Answer" and "Working in small groups" and others. Demonstration organizers such as Venn diagram, T-table, T-scheme, "Cluster" were also used effectively in the training. Short videos on the principles of operation of each type of alternative energy sources were presented. Modern designs of solar energy sources and their current maximum efficiency have been compared with other types of energy. At the same time, interesting crossword puzzles on solar energy sources were distributed to each student as separate handouts.

In addition, these handouts serve to provide students with opportunities for free thinking, the formation of scientific worldviews, the development of scientific and creative research and skills. This was followed by a Q&A session at the end of the workshop. The students expressed their views and opinions on controversial issues and interesting questions. At the end of the circle, the members of the circle were evaluated on the basis of test questions designed for this circle. There are a total of 10 test questions, each question is marked with 0.5 points, with a maximum of 5 points (5 marks). Their test scores were then divided according to grades 5, 4, 3, and 2 (Table 1).

Table 1

Test group		Experiment group	
Number of grades	Assimilation rate,%	Number of grades	Assimilation rate,%
5 mark – 3	13,6 %	5 mark – 11 та	50 %
4 mark – 4	18,3 %	4 mark – 8 та	36,4 %
3 mark – 10	45,4 %	3 mark – 3 та	13,6 %
2 mark – 5	22,7 %	2 mark – 0 та	0 %
77,3 %		100 %	

Based on this table, a diagram of the mastery of the experimental groups in the circle is given (Figure 1).

Figure 1. Experimental (T / G) - indicators of students' mastery in circle sessions conducted in test (S / G) groups.

Experiments have shown that the use of scientific and technical innovations, multimedia teaching aids, visual aids and various handouts, as well as the use of interactive teaching methods and techniques in the study of solar energy in students' knowledge, understanding, comprehension and practice of solar energy serves to form and develop application competencies.

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THE IMPORTANCE OF THE SCIENCE OF HARMONY IN MUSIC PRACTICE

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ABSTRACT

Language is a factor in the existence of every nation in the world. The criterion of his greatness is his spirituality. So, it is well known that one of the basic branches of spirituality is music. The world of music differs from other fields in that it is very broad and equally relevant to all fields. The world of music is an important means of reflecting the life, lifestyle, life, work, values of humanity. Therefore, music is characterized by its artistic and aesthetic potential. "Music" (Greek - the art of inspiration fairies) - a form of art in which the thoughts of human emotional experiences reflect the musical sounds in the imagination.

KEYWORDS:*Music, Chord, Melody, Image, Religious Songs, Alla, Yalla, Lapar, National Magic Songs.*

INTRODUCTION

The content of music consists of musical artistic images that represent changing moods. Music involves a person's various moods (uplifting, enjoying, joyful, fearful, sad, etc.). Every nation in the world has its own musical traditions. Among them, Uzbek music has a very ancient and unique tradition. Uzbek music has always been formed in two great directions and has developed over the centuries. The first direction is folk music, which is connected with the realities of people's lives. It is music that reflects the daily life, work and activities of mankind. The main criteria of folk music are related to ceremonies and events, and there are four directions. These are:

• Children's music.

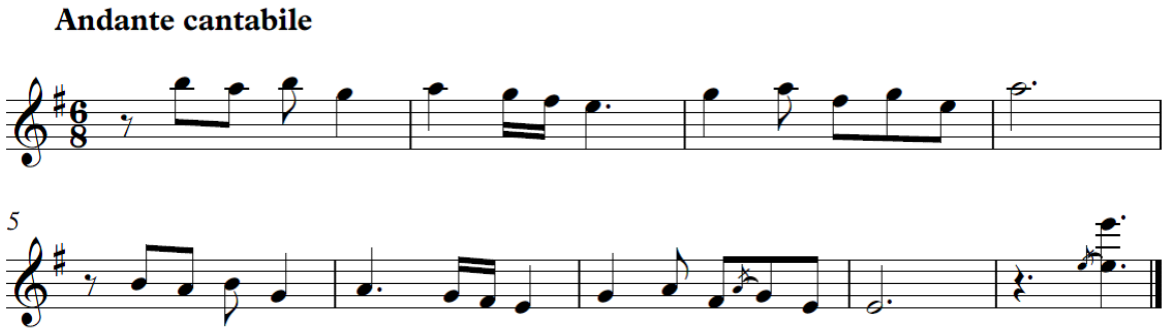
• Labor songs.

• Ceremonial songs.

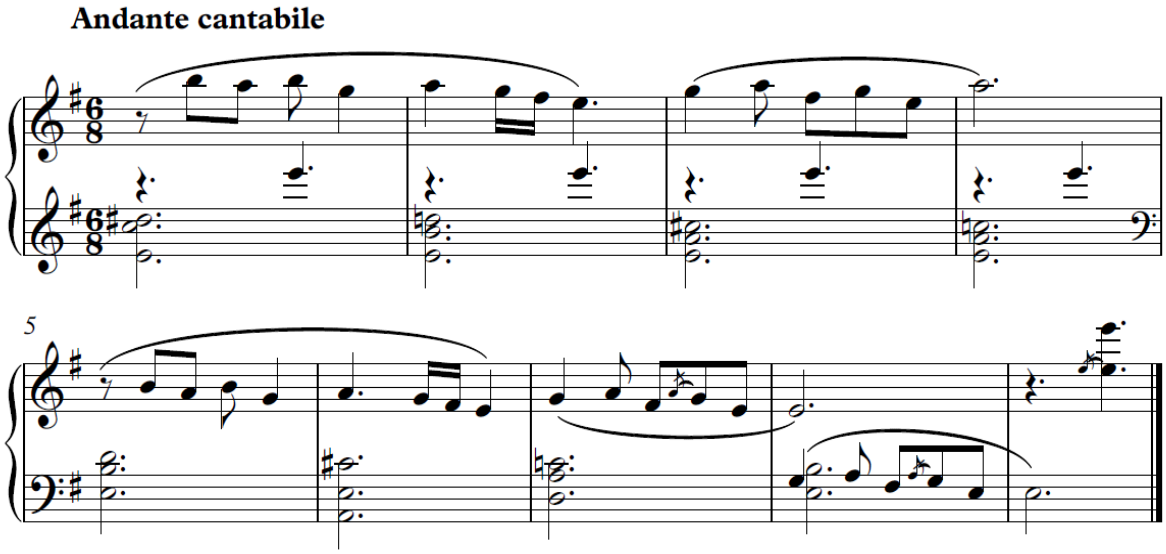
• Religious, magical songs.[1]

In music practice, genres specific to each direction and related to reality have emerged, which have emerged in the national traditions of nations over the centuries. These are genres such as alla, yalla, lapar, terma, song, aytishuv. One of the main features of folk folk music: folk music is created by the people, performed and listened to by the people. However, they are also knowledgeable performers of folk music, and among the people they are called laparchi, yallachi.

In Uzbek folk music: national melodies, gods, lapars, terms, children's songs, labor songs, ceremonial songs, religious and magical songs have been performed and sung in unison throughout history. Nowadays, more vocal works are needed than monophonic works. The science of Harmony explores ways to enrich one-piece works, to make them more interesting, and to make them more effective by harmonizing them with other elements of the piece of music. All these ideas can be seen below the lyric of the composer A. Muhamedo in the example of a small work.



Now, if we listen to this work in harmonic accompaniment, we will hear what “colors” the harmony gave it, how rich the melody was:



Harmony is an important artistic and expressive means of music, the science of chords. Harmony is a Greek word meaning “connection, harmony, proportion”. In music, the combination of sounds into melodies and the sequence of these melodies is called Harmony. Harmony plays a very important role in the development of a musical work, deepening and enriching its expression. Harmony can give the melody a variety of emotional tones and colors. This melody is more pronounced when different melodies are expressed in a series of melodies. Harmony in a

piece of music is associated with melody, metrology, tempo, texture, dynamics. Harmony enriches the melody in the development of the piece of music.

Harmony as a science is studied as follows:

• Chords and their structure and their correct expression in a four-voice statement;

• Functional dependence of chords and their most common sequences;

• Chord connections based on the correct sound direction;

• Different types of cadences;

• Chord and non-chord sounds;

• The basic rules of tonal plan in the development of the work.[2]

A combination of several harmonic sounds that are heard in harmony is called a melody. A melody consisting of three, four, or five sounds of different pitch and name forms a chord."Accord" is a Latin word, accardo means "to harmonize". The main features of a chord are integrity, unity, and the fact that each tone that makes up a chord has a specific function. The inverse structure of the chord is due to the classical harmony of the XVI-XIX centuries. To this day, it has not lost its leading role in music. There are three main types of chords: triplets, seventh chords, and chords. In harmony, a chord consisting of three sounds is called a three-tone chord. This three-tone chord plays a key role in music. much less used.

The chords differ in composition (in terms of the order in which the large or small thirds are preceded). In terms of the base tone, a chord consisting first of a large, then a small third - a major or major triad, first a chord of a small, then a large third - a small or minor trio, two large third - a gain, two small a third - a reduced three is called sound. Triads and septacodes are usually composed of specific steps in a musical soundtrack.[3]

There are three characteristics of each chord:

1 - The sound of a chord is interpreted, for example, as the tones of a third or fifth chord, as well as the sounds of a melody. That is, the horizontal sequence of tones forms the melody side of the chord.

2 - Each chord has its own function. This function is assigned to the tonic;

3 - The brightness, color of the chord, that is, sharp, soft, heavy, light, soft, hard, dark tones, form the phonetic side of it. This aspect of the chord is entirely related to its internal structure, the interval composition, the number of tones, the hesitation, the placement, and the register. The second and third properties of the chord have a general rule that if the functional side of the chord is stronger, the phonemic side will be weaker, and conversely, an effective phonism will loosen the functional connections.

Four voices are most commonly used in music. Four types of four voices:

• High voice - Soprana, also known as melody;

• Low voice - Alt;

• Lower voice - Tenor;

• Lowest sound - So.[4]

The sounds are recorded on two notes combined with the accolade. Bass and tenor sounds are recorded on the bass key, alto and soprano violin key. In the four-voice structure, the bass and bass notes are written downwards, and the tenor and soprano notes are written upwards. These names of chorus sounds are also conditionally preserved in instrumental music. This direction of

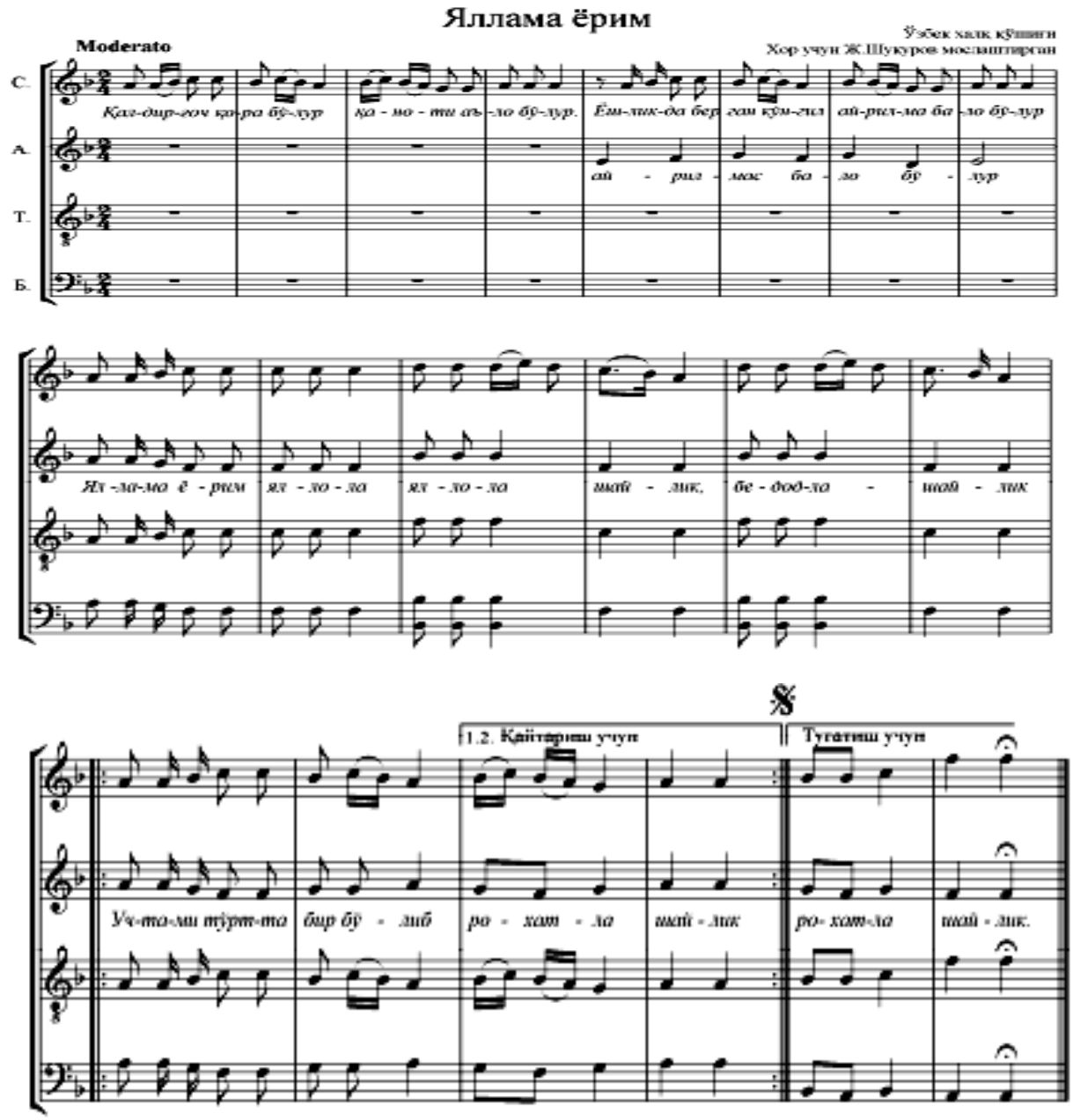
sounds is the direction of sounds, which is the basis of the addition of chords. This direction is due to the different movements of the sounds together. The movement of each individual sound can be smooth or jumping. A prima, a second, or a tertiary movement in the path of a sound is considered to be a smooth movement.

The direction of the sounds is different - opposite, oblique, straight and parallel.

The right thing to do is to move the voices to one side.

Parallel motion - all sounds move in the same direction at the same interval. The opposite action is the movement of voices in different directions.

Oblique motion - one of the voices stays in place and the others move. “Lad” is derived from Slavic (Latin - modus, French. Vaingl - mode), which means the harmonization of the tones of the height system. Lad is a system of interactions between stable sounds. In terms of harmony, Lad is a system of interrelationships of tonal power sound chords that tend to unite. This definition also refers to the melodic-interval relations between the sounds of a single melody and the interrelationships between common chords. The three-tone chord, whose main sound is in the first step of the tonality, acts as a stable, tonic. The chord, whose main sound is at the IV level of tonality, is an unstable chord, which acts as a subdominant. The chord, whose main sound is at the V level of the tonality, is again an unstable chord, which performs a dominant function. These chords are the three main sounds of the fret. In natural major, these basic trinities are denoted by uppercase letters, T, S, D. In music, each chord is not considered in isolation from the harmonies that come before and after it, as well as in the tone and mood of the work. Depending on the tone and tone of the work, the nature of the chord, ie the function, changes. For example, the major trinity (domisol) is a stable chord in the major major, because it consists of stable levels of tonality (I, III, V). The same chord is the fourth major triad of Sol major tones, which includes two unstable fourth and fourth major tones. In the major tone, this chord is a V-step triad, which is an unstable chord. The reason is that it includes the leading VII and II levels of tonality. This means that the chord, given according to the mood and tone of the work, has a certain tone and performs a specific function. In the second half of the twentieth century, a lot of work was done in Uzbekistan to translate national folk songs for choirs. Among them are B.Umidjanov, S.Yudakov, M.Burhanov, Ik.Akbarov, N.Norkhojayev, J.Shukurov, A.Mansurov and others. For example, the well-known folk song “Yallamayorim” adapted by J. Shukurov for choral voices.[5]



This work is a clear example of the importance of harmony in enriching music

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LEGAL ASPECTS OF DOPING AND DRUGS IN INTERNATIONAL TOURNAMENTS BY SPORTSPERSONS

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ABSTRACT

Doping is one of the most vexing problems in sports, and the organisers go to great lengths to discourage it. Doping was widely reported in the media, in which athletes used illegal substances to boost their efficiency and performance. Athletes that use traditional types of doping such as cardio-respiratory-hormonal stimulants don't get tired as easily. In the category of stimulant medications, there are many different types of medicines that aim to improve an athlete's endurance and are often used for doping purposes. They also decrease an athlete's perception of pain and tiredness while simultaneously improving their cognitive function and conduct. Many well-known drugs fall under this category, such as ephedrine, amphetamines, opium, cocaine, and so on. For this reason the organising bodies and boards of the International Olympic Games are constantly monitoring the athletes to ensure that any inappropriate conduct may be legally addressed. World Anti-Doping Agency (WADA) and the National Anti-Doping Agency (NATA) are among the organisations that have shown interest in it (NADA). Between 2009 and 2012, 48 Indian athletes were discovered to be using performance-enhancing substances and medications. There were still 295 instances of doping in athletics in 2019, approximately 300 cases of doping in bodybuilding, and 280 cases in cycling, according to a WADA report released in 2019. There have been many instances when players engaged in such actions have received penalties and other forms of punishment. WADA said the penalties for breaking anti-doping procedures range from a warning to a lifetime ban. According to the circumstances, the ban may vary based on the type and likelihood for recurrence of a violation of an anti-doping legislation. The sports league, on the other hand, is in charge of taking steps to withdraw the medal.

KEYWORDS: *Doping, Drugs, Stimulants In Sports, Doping In Olympics.*

INTRODUCTION

Doping refers to the use of chemicals or medications to improve one's performance in a game or during a sporting event as a threat or curse in sports. While the word "doping" is not new, the

usage of it has occurred many times, notably during the Olympic Games (Petersen, T.S., 2020). There were many performance-enhancing techniques in use before sports doping was invented, which were later adopted by athletes to improve their own performance and efficiency in order to gain notoriety, popularity, and financial gain. There are a variety of doping goods on the market, such as performance-enhancing medications and medicines designed to keep gamers from becoming too tired when playing video games.

Doping has grown to be a significant and difficult issue for sports governing bodies since athletes is always looking for new methods and strategies to avoid being discovered.

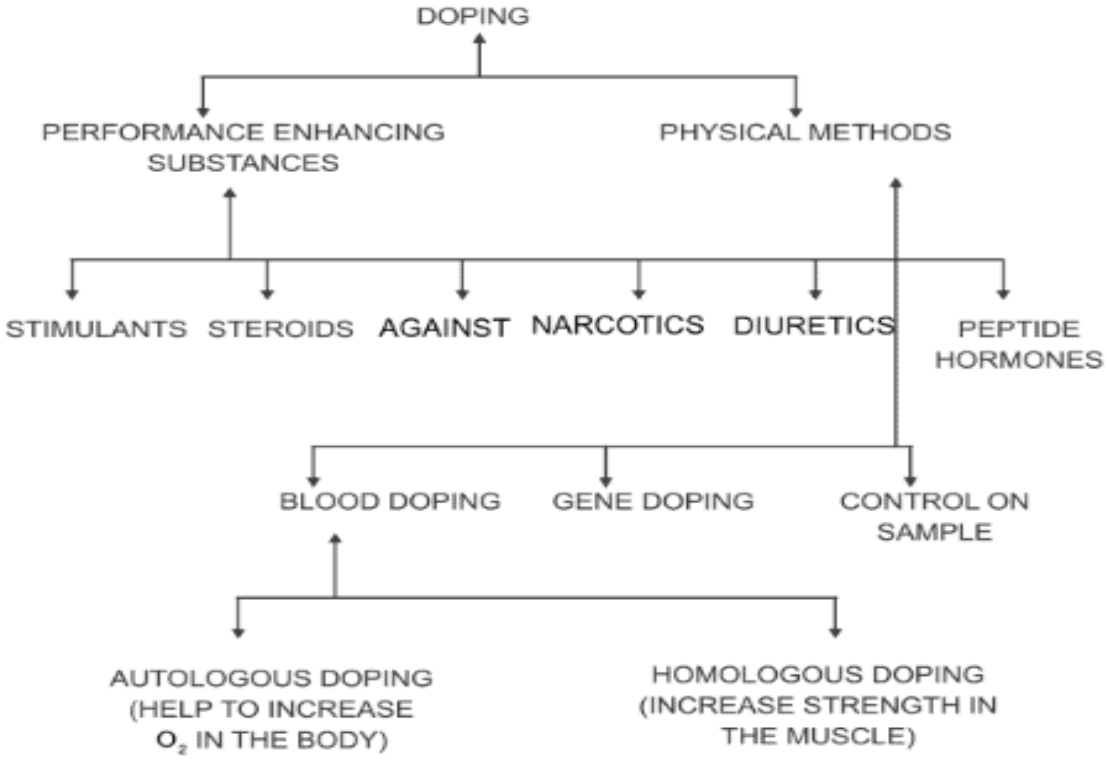

Figure 1 : Doping in Sports

Many Olympic competitors learned in the early 1900s that they might enhance their athletic skills by using testosterone boosters. Increasingly, it was clear that using performance-enhancing drugs not only posed a danger to the integrity of sport but could also have life-threatening consequences for the athlete. Athletic drug usage was only responsible for one fatality during the Olympic Games in Rome in 1960. Danish cyclist Knud Enemark Jensen died after being knocked from hdis bike during a road race. A coroner's investigation revealed that he had been using amphetamines before the race, which contributed to his passing out. The death of Jensen opened the eyes of the world to the widespread usage of performance-enhancing drugs among professional sportsmen. Sports federations began banning performance-enhancing drugs in the mid-1960s, and the International Olympic Committee (IOC) followed suit in 1967.

Hans-Gunnar Liljenwall, a Swedish pentathlete in the 1968 Summer Olympics, was the first Olympic athlete to test positive for the usage of performance-enhancing substances. He forfeited his bronze medal for alcohol use, "two drinks" to calm his nerves.

At the 1968 Olympics, just one competitor, Liljenwall, tested positive for a prohibited drug; nevertheless, as testing technology and methods developed, the number of athletes found to be chemically enhancing their performance grew.

One of the more egregious examples of doping in sports is East Germany's participation in the Olympics in the 1970s and 1980s. Documents found in 1990 revealed that East German coaches and trainers had given anabolic steroids and other medications to numerous female athletes, particularly swimmers. Parents had no idea that girl as young as eleven were being put on a medication regimen without their permission. As early as the 1976 Summer Olympics, American female swimmers, notably Shirley Babashoff, accused the East Germans of doping. According to both the international and domestic press, Babashoff's comments were a case of resentment because Babashoff, who was widely expected to win multiple gold medals, instead took home three silvers, all of which she lost to either East Germans Kornelia Ender or Petra Thümer, and one gold medal in a relay race. Even though their medal total rose from four silvers and one bronze in 1972 to ten golds (out of a possible 12), six silvers, and one bronze in 1976, there was no suspicion of cheating on the side of the East German female swimmers. Until the collapse of the Berlin Wall, there was no conclusive proof that East Germany had engaged in a state-sponsored drug regimen to significantly enhance their competitiveness at the Olympic Games and other international sports events. Many of the East German officials in charge of this operation have since been prosecuted and convicted in the German prison system for a variety of offences.

'Doping in Germany from 1950 to present,' a study shows that government funding contributed to a widespread doping programme in West Germany. For decades, West Germany promoted and covered up a doping culture in many sports. Athletes from West Germany tested positive for doping at the 1972 Summer Olympics in Munich and the 1976 Summer Olympics in Montreal.

KGB colonel, according to British writer Andrew Jennings, said that the agency's operatives had disguised as anti-doping officials from the International Olympic Committee in order to undercut drug tests and that Soviet sportsmen were "rescued with [these] great efforts.".

According to a 1989 Australian investigation, the Summer Olympics of 1980 were a disaster "Nearly all of the medal winners from the Moscow Olympics, including all of the gold medal winners, had used some kind of performance-enhancing medication. These Olympics in Moscow might just as well have been dubbed the Chemists' Games."

In preparation for the 1984 Summer Olympics in Los Angeles, the Soviet Union planned a statewide doping system in track and field, according to documents discovered in 2016. The paper, which was written before the nation decided to boycott the Olympics, outlined the program's current steroid activities and made recommendations for improvements. Dr. Sergei Portugalov of the Institute for Physical Culture drafted the letter to the Soviet Union's director of track and field. A key player in the Russian anti-doping program's execution before to the 2016 Summer Olympics was Portugalov.

TABLE 1: DOPING IN ASIAN GAMES JAKARTA–PALEMBANG 2018

Name	**Sport**	**NOC**	**Banned substance**
Kemi Adekoya	Athletics	Bahrain	Stanozolol
Sanjivani Jadhav	Athletics	India	Probenecid
Nirmala Sheoran	Athletics	India	Drostanolone and Metenolone
Kumush Yuldashova	Kurash	Uzbekistan	Stanozolol
Pürevdorjiin Orkhon	Wrestling	Mongolia	Stanozolol

Rüstem Nazarow	Wrestling	Turkmenistan	Furosemide

In the 1980s and 1990s, China had a state-sanctioned doping programme for athletes.

A Chinese Olympic team doctor, Chen Zhangho, said in an interview with the Sydney Morning Herald in July 2012 that he had tested hormones, blood doping and steroids on around fifty top athletes during the 2012 Summer Olympics in Los Angeles, Seoul and Barcelona. Furthermore, Chen said that the United States, the Soviet Union, and France were all taking performance-enhancing drugs at the same time that China was.

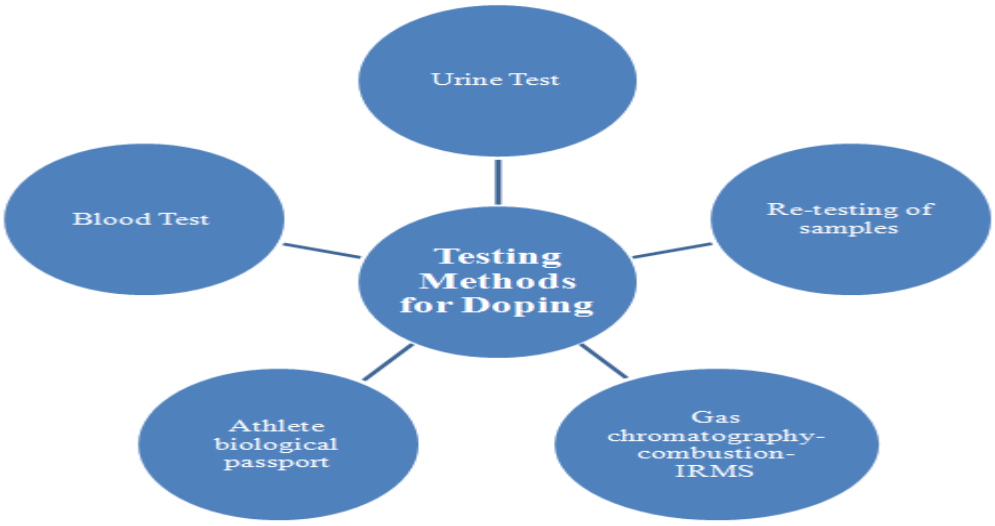

Figure 2 : Testing of Doping

It wasn't until the International Olympic Committee (IOC) seized control of the anti-doping fight in the late 1990s that WADA was officially established in 1999. A number of gold medalists in weightlifting and cross-country skiing were disqualified after failing a drug test at the Summer and Winter Olympics in 2000 and 2002, respectively. During the Winter Olympics of 2006, just one competitor had a medal withdrawn because of a failed drug test. There are several sports federations across the globe that have tried to replicate the IOC's drug testing policy (now known as the "Olympic Standard").

The IOC used the World Anti-Doping Agency to administer testing to 3,667 competitors at the Beijing Games. Detection of prohibited drugs and recent blood transfusions was made possible with the use of urine and blood tests. Six athletes failed drug tests in Beijing, despite the fact that their National Olympic Committees had already banned them from competing.

As the terms doping is associated with "using prohibited substances in sport", it is clear that doping is a threat and do not promote the sports spirit rather only focusing on the winning by unethical ways. When it comes to professional sports, doping is the use of banned substances to enhance an athlete's performance. Athletes often use the term "doping" to describe methods of enhancing performance and decreasing tiredness while competing. Even today, doping in sports is still traceable and regulated by WADA and NADA and a set of regulations. Doping situations in India are governed by the National Anti-Doping Agency (NADA), which decides on future measures against the athletes. However, more effort has to be done to develop mechanisms and legislative standards that are more explicit and have harsher penalties.

CONCLUSION

India now ranks third in the world when it comes to the adoption of medications and pharmaceuticals intended to improve athletic performance. For the enforcement and

administration of India's anti-doping laws, the specialised agency National Anti-Doping Agency (NADA) was set up in the nation. Founded in 1890 under the Societies Registration Act, it was incorporated as a company on November 24th of that year under a stringent code of conduct and anti-doping rules. The anti-doping organisation in India monitors athletes' use of various medications and treatments from a legal standpoint to prevent doping. An analysis of the WFI (World Adverse Analytical Finding Index) shows that India ranked 7th in 2017 and 5th in the list of nations that use these medicines. In 2015, India had the second-highest number of ADRVs (Anti-Doping Rule Violations). For India, enacting tough anti-doping regulations is a top priority in the fight against drug cheaters. NADA's long-term goal is to guarantee that doping in sports is strictly regulated and legalised.

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A REVIEW ON COGNITIVE RADIO NETWORKING AND COMMUNICATIONS

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ABSTRACT

Cognitive radio (CR) is the technology that enables dynamic spectrum access, a strategy that solves the spectrum shortage issue that many nations face. With cognitive radio networks, the spectrum sensing issue has taken on new dimensions. In wireless communication, the radio spectrum is the most precious resource. Cognitive radio and cognitive-based networking are converting static spectrum allocation communication systems into dynamic spectrum allocation communication systems. Cognitive radios are cognitive devices that can detect external circumstances and adjust their settings to provide the best possible performance at individual nodes or at the network level. As a result, CR is generally considered as one of the most promising wireless communication technologies of the future.

KEYWORDS: *Cognitive Radio,Dynamic Spectrum Access, Softwaredefined Radio.*

1. INTRODUCTION

The right to access the spectrum in wireless communication networks is usually specified by frequency, transmission power, spectrum owner (i.e., licensee), kind of usage, and license period. Typically, a license is given to a single licensee, and this licensee's usage of spectrum must adhere to the license's specifications. The licensee cannot alter the kind of use or transfer the right to other licensees under the earlier spectrum licensing systems. Furthermore, radio spectrum licenses are issued for greater areas and in larger pieces. All of these issues restrict the use of the frequency spectrum in the present paradigm for spectrum allocation and assignment, resulting in poor utilization. Because current and future wireless applications and services need increased transmission capacity and data transfer, the radio spectrum's usage must be enhanced[1]–[3].

The above-mentioned constraints should be addressed by changing the spectrum licensing system and implementing a dynamic spectrum management model in order to enhance the efficiency and use of the radio spectrum. The fundamental concept is to provide greater flexibility in spectrum access by enabling unlicensed users to use the radio spectrum under specific conditions and limitations. Traditional wireless systems are unable to benefit from the

increased flexibility offered by this spectrum licensing model since they were intended to operate on a specific frequency band.

As a result, the idea of cognitive radio (CR) developed, with the primary aim of providing flexibility to wireless transmission through dynamic spectrum access (DSA) so that frequency spectrum utilization may be improved without sacrificing the advantages of static spectrum allocation. In the sense that it can detect channels including signals from a wide range of heterogeneous devices, networks, and services, the CR is a "smarter radio." The radio will employ complex algorithms based on this sensing to share the restricted bandwidth channel with other users in order to accomplish effective wireless communication. In this way, the CR concept extends the concept of multiple access among devices in a single homogeneous system to multiple access among devices in different radio spectrums using different radio transmission techniques, resulting in different systems (i.e., inter-system multiple access as opposed to the more traditional intra-system multiple access), which have different priorities in accessing information[4]–[7].

2. COGNITIVE RADIOS

Joe Mitola invented the term "Cognitive Radio" (CR) in a number of articles and his PhD thesis in 1999-2000. The phrase was used to characterize intelligent radios that can make choices on their own based on collected knowledge about the RF environment, as well as learn and plan based on their previous experience. Clearly, such intelligence necessitates the radio's self-awareness, as well as content and context awareness. Furthermore, Haykin describes CR as a radio that is capable of being aware of its surroundings, learning, and adapting its operational parameters in real-time with the goal of delivering reliable communication anytime, everywhere, and with spectrally efficient spectral efficiency.

“Cognitive radio is an intelligent wireless communication system that is aware of its surrounding environment,” according to the definition. A cognitive radio transmitter would learn from its surroundings and adapt its internal states to statistical changes in existing RF stimuli by real-time and on-line changing transmission parameters (e.g., frequency band, modulation mode, and transmission power).” This definition basically encapsulates the core idea of CR. A cognitive radio network (CRN) allows us to communicate with other CR nodes and users. Changes in the radio environment, topology, operational circumstances, or user needs may all affect the communication parameters. The two primary goals of the CR are to enhance frequency spectrum utilization and to provide extremely dependable and efficient wireless communications[8], [9].

Cognitive radios are self-aware and intelligent devices that can detect changing environmental conditions and adjust parameters such as frequency, modulation techniques, coding techniques, power, and so on in response to changing statistical communication environments, resulting in efficient resource utilization. Cognitive radios must be capable of learning and deciding on their operational settings, as well as changing transmission and reception parameters to satisfy performance needs and optimize QoS. The Cognitive engine is in charge of the cognitive radio's operations (CE). Sensing, analysis, learning, decision-making, and reconfiguration are all activities performed by the cognitive engine. Users in cognitive radio networks are divided into two categories: main (licensed) and secondary (unlicensed or cognitive). The use of the licensed spectrum is prioritized for licensed users. Unlicensed users, on the other hand, may communicate in licensed spectrum opportunistically by altering their communication settings in an adaptive manner when spectrum gaps become available[10].

Horizontal spectrum sharing and vertical spectrum sharing are the two main types of cognitive radio-based DSA or sharing. All users/nodes have equal regulatory status in the former scenario, while all users/nodes do not have equal regulatory status in the second situation. There are main (licensed) users and secondary (unlicensed) users in vertical spectrum sharing, and the secondary

users opportunistically access the spectrum without impacting the prime users' performance. Horizontal spectrum sharing may take place between homogeneous or heterogeneous networks. Symmetric sharing occurs when all networks in a diverse environment have cognitive/adaptive skills (i.e., all coexisting networks have equal incentives to adapt). Asymmetric spectrum sharing, on the other hand, occurs when one or more networks lack cognitive/adaptive skills (e.g., coexistence of legacy technology and CR technology). The coexistence of high-speed IEEE 802.11 networks with low-power IEEE 802.15.4 networks is an example of this. Opportunistic spectrum access is the term used to describe DSA in vertical spectrum sharing. The technique for the secondary user to operate inside a frequency range that is allocated for the main user is called opportunistic spectrum access.

In 1999, as an extension of Software Defined Radio, the idea of Cognitive Radio (CR) emerged as a new paradigm (SDR). It refers to a scenario in which intelligent radio devices and related network entities interact in such a way that they can change their operational settings in response to the requirements of the user/network while also learning from previous experiences. Since then, there has been a large amount of study on CR-related issues in the scientific community. Many standards organizations have started and advanced standardization efforts on Cognitive Radio Systems (CRS) (including TV White Spaces—TVWS). Almost every regulatory body in the United States, Europe, and Asia–Pacific has recognized the impact of CRS on spectrum allocation.

2.1. Cognitive Capability:

It refers to the CR's capacity to detect the radio spectrum using advanced methods and select suitable settings to adapt to a changing environment. Also known as the cognitive cycle

The cognitive cycle's three major stages are as follows:

- Spectrum sensing: A cognitive radio analyzes the available radio spectrum, records its data, and pinpoints any gaps.
- Spectrum Analysis: Using spectrum sensing, CR analyzes and calculates the features of the observed spectrum hole.
- Spectrum decision: This refers to the ability to choose the best available channel for SU communication based on estimated characteristics and user needs.

2.2. Re-Configurability:

The capacity to respond to changes in operating settings while the radio is in use without modifying the hardware components is known as re-configurability. The following are the re-configurability parameters:

- Frequency of operation
- Techniques for modulation
- Transmission capacity
- Information and communication technologies

2.3. Classification:

There are two major kinds of cognitive radio, depending on broadcast and receiving parameters:

- Full Cognitive Radio (or Mitola radio): Every observable parameter by a wireless node (or network) is taken into account.
- Spectrum-Sensing Cognitive Radio: This kind of cognitive radio solely considers the radio frequency spectrum.

Other kinds are reliant on the spectrum segments that are accessible for cognitive radio:

- Licensed-Band Cognitive Radio: It may utilize bands that are only available to licensed users, such as the UNII or ISM bands. The IEEE 802.22 working group is working on a wireless regional area network (WRAN) protocol that will utilize unused television channels.
- Cognitive Radio with Unlicensed Bands: This technology can only use unlicensed portions of the radio frequency (RF) spectrum. The IEEE 802.15 Task Group 2 standards, which concentrate on the coexistence of IEEE 802.11 and Bluetooth, define one such system.

2.4. Spectrum Sensing Methods for Cognitive Radio:

In cognitive radio, some of the most popular spectrum sensing methods are:

1. Energy Detector-Based Sensing: Due to its minimal computational and implementation complexity, the energy detector-based technique, also known as radiometry or periodogram, is the most popular method of spectrum sensing. It is a more general approach since receivers do not need to be aware of the signal of the main user. The signal is identified by comparing the energy detector's output with a noise-floor-dependent threshold.
2. Waveform-Based Sensing: In wireless systems, patterns are often used to aid synchronization or for other reasons. A preamble is a predetermined sequence that is sent before each burst, whereas a midamble is sent in the midst of a burst or slot. Sensing may be done in the presence of a known pattern by comparing the received signal to a known duplicate of itself. This technique is known as waveform-based sensing or coherent sensing, and it is only applicable to systems with established signal patterns.
3. Cyclostationarity-Based Sensing: Cyclostationarity feature identification uses the cyclostationarity characteristics of received signals to identify main user transmissions. Periodicity in the signal or in its statistics such as mean and autocorrelation may produce cyclostationary characteristics, or they might be deliberately induced to aid spectrum sensing.
4. Matched-Filtering Technique: When the transmitted signal is known, matched-filtering is recognized as the best technique for detecting main users. When compared to other techniques, the primary benefit of matched filtering is the short time it takes to reach a given percentage of false alarm or miss detection. To demodulate received signals, matched-filtering requires cognitive radio. As a result, it requires a thorough understanding of the main users' signaling characteristics, such as bandwidth, operating frequency, modulation type and order, pulse shaping, and frame format.

2.5. Evaluation of Different Sensing Methods:

Because of the coherent processing that results from utilizing deterministic signal components, waveform-based sensing is more robust than energy detector and cyclostationarity-based techniques. However, a priori information about the main user's attributes should be provided, and primary users should provide established patterns or pilots.

When two common assumptions are not true, the performance of energy detector-based sensing is restricted. It's possible that the noise isn't stationary, and its variance is unknown. Baseband filter effects and spurious tones are two more issues with the energy detector. When the noise is stationary, cyclostationary-based techniques perform worse than energy detector-based sensing

methods, according to the literature. Noise becomes nonstationary in the presence of co-channel or neighboring channel interferers. As a result, methods based on energy detectors fail, whereas cyclostationarity-based algorithms are unaffected. Cyclostationary characteristics, on the other hand, may be entirely lost owing to channel fading. An SNR wall for cyclostationary based feature detectors, comparable to energy detectors, is demonstrated in that model uncertainty. Furthermore, it is well known that cyclostationarity-based sensing is sensitive to sample clock offsets.

3. DISCUSSION

One of the most precious natural resources is the radio frequency spectrum. The shortage of frequency spectrum has resulted from the high demand for radio channels. Recent spectrum measurements, however, indicate that the spectrum is underused and that there is unused spectrum. Cognitive Radio (CR) is a crucial technology that allows for efficient spectrum use and alleviates spectrum shortages. CR technology detects unused spectrum, also known as white spaces or spectrum holes, and assigns it to the Secondary User (SU) or unlicensed user without interfering with the Primary User (PU) or licensed user. If a PU arrives on the network and there are no more accessible spectrum bands, one of the SU must release the band, which is then allocated to the main user.

There is no established channel for data communication in CR. Sensors must consult with their neighbors and choose a communication frequency channel. Because there is no coordination between PUs and SUs, it is very difficult. Various methods must be used to anticipate the arrival of the PU on the channel. Many permitted bands are not utilized and stay vacant, according to a study by the Federal Communications Commission (FCC). According to the FCC, spectrum usage in highly populated metropolitan areas seldom exceeds 35 percent at any one moment. It demonstrates that certain frequency bands are extensively utilized, while others are just moderately used. The remaining frequency bands are free. A cognitive radio method is required to address the issue of underutilized spectrum.

The CR method is a novel paradigm that enables the SU to utilise the spectrum opportunistically by detecting unoccupied spectrum, commonly known as spectrum gaps or white spaces. If the PU comes, it uses the dynamic spectrum access method to leave the band without interfering with other users.

One of the primary goals of CR is to take advantage of the spectrum gaps whenever possible. The SU should detect the PU's arrival and relocate to another unoccupied area without interfering with the PU. There are two different kinds of sensing methods.

A) Technique for signal processing

B) Technique of cooperative sensing.

Energy detection, matching filter detection, cyclostationary based detection method, and other techniques are all part of the Signal processing technology. Similarly, cooperative sensing methods are classified as centralized spectrum sensing, decentralized spectrum sensing, and hybrid spectrum sensing.

4. CONCLUSION

A short overview is provided of CR technology and its many sensing methods in this article. A survey of two kinds of sensing methods, signal processing and cooperative sensing approaches, is performed. With the advancement of cognitive radio technology, dynamic spectrum sharing has emerged as a potential method to increasing spectrum efficiency. Cognitive radio, which is one of the attempts to make more effective use of the available spectrum via opportunistic spectrum use, has grown in popularity. Sensing the available spectrum possibilities is an essential aspect of cognitive radio. Licensed users may share their spectrum under the new spectrum management paradigm. We looked at matching filter detection, energy detection, and cyclostationary feature identification as three distinct kinds of signal processing methods. Although the energy detection method is simple and widely used, it has a poor SNR. Matched filter detection needs more power and has a higher complexity, but it reduces sensing time and improves SNR. In addition, the three kinds of cooperative sensing methods, centralized, decentralized, and hybrid sensing systems, are discussed. These methods do not require any previous signal knowledge. Based on the comprehensive study, it can be stated that each sensing method has its own set of advantages and disadvantages. As a result, they must be implemented in accordance with the applications. We went on to identify the research difficulties and discovered that this new study field had a lot of potential.

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A REVIEW ON WIRELESS MULTIMEDIA COGNITIVE RADIO NETWORKS

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ABSTRACT

Time critical and delay sensitive multimedia applications require more spectrum and transmission resources. With the provision of cognitive radios (CRs), the underutilized spectrum resources can be exploited to gain more bandwidth for the bandwidth hungry applications (multimedia applications). Cognitive radio networks (CRNs) also have the flexibility to adjust their transmission parameters according to the needs of multimedia services or applications. For this reason, wireless multimedia cognitive radio networks (WMCRNs) have gained much attentions in today's research domain. In this paper, we present a comprehensive survey of WMCRNs. various multimedia applications supported by CRNs, and various CRbased wireless networks are surveyed. We highlight the routing and link layer protocols used for WMCRNs. We cover the quality-of-experience (QoE) design and security requirements for transmitting multimedia content over CRNs. We provide an indepth study of white space, TV white space, and cross-layer designs that have been used for WMCRNs. We also survey the major spectrum sensing approaches used for the communications of bandwidth hungry and time-critical data over CRNs.

KEYWORDS: *Cognitive Radio Network (CRN), Multimedia Communication, Secondary Users, Primary Users, Quality-Of-Service, Quality-Of-Experience.*

1. INTRODUCTION

Recent advancements in wireless communications technology have made it possible to link a huge number of wireless devices in today's environment in a seamless manner. The optimum use of spectrum resources is also required to provide wireless connection to millions of wireless devices. It turns out that reserving a few megahertz (MHz) of spectrum for wireless communications is expensive. Static spectrum allocation has also resulted in underutilization of spectral resources. Cognitive radio networks have resulted as a result of this (CRNs). By using the underused licensed spectrum with the assistance of CRNs, greater utilization of current spectrum resources has been accomplished [1].

Both real-time and non-real-time traffic may be supported by CRNs. Multimedia content transmission via CRNs is difficult due to the dynamic nature of CRNs. Various advances in architecture, communications protocols, spectrum sensing techniques, and interference mitigation approaches have been made to support delay-sensitive and time-critical data transmission in CRNs. Seamless multimedia communications that reside within the limited spectral resources can be well realized with the help of CRNs (by harnessing under-utilized, licensed spectral resources).

1.1. Multimedia Communication in CRNs Is Necessary:

Multimedia applications, which are regarded to be time-sensitive and bandwidth-hungry, have gotten a lot of attention in the academic community lately. Multimedia applications need greater bandwidth, throughput, quality of service (QoS), dependability, and timeliness when sent [2]. End consumers have shown a strong interest in current multimedia apps such as YouTube, Netflix, Skype, and others.Multimedia communications over current spectrum resources present significant difficulties. The premise is that spectral resources have become scarce as a result of the massive growth in wireless devices. However, new spectrum analysis studies have shown that a significant part of the spectrum is underused. CRNs have been generally recommended as a potential approach to alleviate spectrum underutilization by effectively using existing spectrum resources. The traditional static spectrum sensing method has been replaced by dynamic spectrum access thanks to CRNs (DSA). CRNs can now detect idle, licensed bands with the assistance of DSA, allowing secondary users (SUs) to broadcast with little disturbance to main users (PUs).

Researchers must develop new design paradigms in order to provide these bandwidth-hungry and delay-sensitive applications of underused spectrum resources [3]. To address spectrum shortages, the transmission of multimedia applications via CRNs has been developed for this purpose. The literature has extensively investigated the continuous transmission of delay sensitive traffic without significant delay using the DSA method. While utilizing the licensed band, cognitive users, also known as SUs, may usually send delay-sensitive and time-critical data without delay or disruptions [4].

Multimedia traffic, particularly video streaming, is projected to account for 69 percent of all consumer traffic on the Internet. It is anticipated to rise in the near future, and consumers will soon turn to multimedia apps as their primary applications. As a result, measuring the performance of these apps is critical. Typically, the most commonly used network focused measure to evaluate the performance of a network's capacity to handle delaysensitive traffic is Quality of Service (QoS). In addition to QoS, the quality of multimedia services has been assessed in terms of quality of experience from the user's viewpoint (QoE). Both QoS and QoE evaluate the quality of multimedia material from the standpoints of the network and the end user. While using CRNs in multimedia communications, additional metrics must be evaluated in order to measure CRN performance. Spectrum sharing, mobility, administration, sensing, and handoff, in combination with QoS and QoE, provide a comprehensive picture of wireless multimedia cognitive radio networks' quality multimedia applications (WMCRNs).

WMCRNs can handle a wide variety of time-sensitive and delay-sensitive applications. Various CRNs centric or user centric metrics of multimedia traffic have been investigated while a broad variety of applications from video linked to safety, medical, voice-over IP (VoIP), and heterogeneous applications have been studied [5].CRNs must also deal with a number of resource limitations while supporting multimedia applications. WMCRNs suffer a number of limitations, including energy shortage, PU interference, poor CPU performance, and restricted system memory.

2. COGNITIVE RADIO AND MULTIMEDIA COMMUNICATION

2.1. Cognitive Radio Networks:

2.1.1. Dynamic Spectrum Access:

According to reports, the distribution of fixed spectrum resources to licensed users has resulted in the frequency band being underutilized. The static spectrum access technique, as practiced, underutilizes spectrum resources in both the temporal and geographical domains. Traditional wireless networks' static spectrum access technique has been replaced by dynamic spectrum access (DSA) or dynamic spectrum management (DSM), resulting in the development of CRNs. The flexibility of spectrum sharing allows users (SUs) to exploit spectrum gaps or white spaces in the licensed spectrum with the assistance of DSA [6]. This also necessitates licensed users' collaboration in order to prevent interference and ensure the smooth and stable functioning of spectrum sensing. The difficulties of assessing the performance of many variables including spectrum sensing, communications protocols, interference mitigation (self-interference mitigation in the case of full-duplex CRNs), and spectrum use analysis have all been thoroughly studied. Enforcing adherence to spectrum regulations necessitates the development of sophisticated DSA designs to achieve the aim of CRNs in a variety of advanced and developing sectors. The cognitive cycle is at the heart of CRNs' operations.

2.1.2. Cognitive Cycle:

The whole spectrum detection and allocation process has been split into a cycle of four stages, dubbed the cognitive cycle, to make CRN operation seamless and comprehensible. First, different spectrum sensing techniques are used to identify white areas in the spectrum. Spectrum sensing methods have been thoroughly investigated. Second, the spectrum is controlled once it has been sensed. To enable SU communications in the licensed band, interference to PUs is kept to a minimum during spectrum management [7]. Third, the spectrum resources that are detected and controlled are shared. White spaces are utilized in spectrum sharing by using the underlay, overlay, or interweave methods of white space usage. The idle spectrum resource may be shared cooperatively or in a non-cooperative manner. When the PUs arrive, the SUs must leave the licensed spectrum band. Spectrum mobility provides SUs with allocated spectrum holes to maintain continuous connections, avoiding the lengthy delays caused by PU disruptions. The cognitive cycle (spectrum sensing, management, sharing, and mobility) may assist to achieve effective spectrum use while minimizing interference for licensed users.

2.1.3. Spectrum Sensing Approaches:

The primary function of spectrum sensing methods in CRNs is to detect white spaces in the available spectral resources. The efficiency of spectrum sensing methods is entirely responsible for the CRNs' performance. Different spectrum sensing methods have been developed depending on the available bandwidth and application needs. To perceive the available idle spectrum gaps, CRNs often use energy-detection based spectrum sensing methods [8]. Other methods based on spatial correlation, such as cyclostationary spectrum sensing, have also been developed to utilize white space in the license band, in addition to energy detection. QoS-aware spectrum sensing enables time-critical applications, depending on the needs of multimedia applications. Cooperative spectrum sensing for CRNs has also been presented as an energy-detection based spectrum sensing method to enable real-time applications.

2.1.4. Secondary and Primary Users:

With the assistance of CRNs, spectrum underutilization may be reduced while interference to licensed users is reduced. Secondary users (SUs) are often referred to as CRs users, and the networks they utilize are referred to as secondary networks. Licensed users are referred to as

main users (PUs), and the networks that they connect to are referred to as primary networks.In CRNs, SUs detect PU activity on the main networks and begin using licensed spectrum resources after locating white spaces. Underutilization of the licensed spectrum is reduced as a result.

2.2. Multimedia Communication:

The transmission of bandwidth-hungry and delay-sensitive traffic puts a strain on network resources. The radio spectrum is a valuable resource, and multimedia communications that rely on it need that researchers devise effective and optimal solutions. Multimedia information via CRNs may be transmitted with more dependability and reduced latency after effectively using the spectrum with CRNs.Traditional wireless networks and CRNs have both been examined from different angles when it comes to multimedia communications [8]. Multimedia communications, on the other hand, have been studied using a variety of measures. It's difficult to measure the performance parameters of WMCRNs in general. WMCRN performance indicators may be divided into two categories: network focused and user centric.

2.2.1. Network Centric Metrics:

WMCRNs' real performance is captured and quantified using network centric metrics. QoS is the fundamental network centric measure for this purpose, not just for conventional wireless networks but also for WMCRNs. Throughput, end-to-end latency, average delay, jitter, packet loss, and bandwidth are often used to evaluate network performance for different multimedia applications under QoS.

2.2.2. User Centric Metrics:

Users' approval of multimedia apps is measured using user-centric metrics. Network centric metrics have been extended to include user centric metrics. The most commonly used user-centric measure, quality of experience (QoE), assesses user satisfaction with multimedia content delivered via networks [9]. Various additional metrics have been explored in combination with QoE in WMCRNs. Multimedia content consumers may suffer communications interruptions as a result of the spectrum hand-off (in rare cases). As a result, the spectrum hand-off may be considered a performance measure for assessing WMCRN performance. Spectrum allocation methods may be used as user-centric metrics to evaluate user satisfaction with a service or application, in addition to spectrum hand-off.

2.2.3. Popular Multimedia Applications:

Traditional multimedia applications (video, audio, picture, online gaming, and video-on-demand) have been examined from a variety of viewpoints by traditional wireless networks. In addition, much effort has been done to provide support for multimedia communication via CRNs. WMCRNs can now handle the transmission and reception of both time-critical and non-critical data while meeting the media content's QoScriteria.WMCRNs support a broad variety of multimedia applications [10]. WMCRNs have become more versatile thanks to CR-based wireless networks like CRsmart grid, cognitive radio sensor networks (CRSNs), CRcellular networks, CR-mesh networks, and others, which enable a wide variety of multimedia applications. WMCRNs may now offer support for all such delay sensitive and time critical applications, from safety to medical.

2.3. Motivation of Using Cognitive Radio for Multimedia Communication:

Multimedia application communications may be made more dependable and efficient by using CRs. CRNs may now transmit delay-sensitive and bandwidth-hungry applications while remaining within restricted spectrum and transmission resources. The following are the main reasons for utilizing multimedia communications via CRNs:

- Time-critical multimedia applications that are delay sensitive and bandwidth hungry need sufficient spectrum resources to meet user expectations. Multimedia applications may now use the idle licensed spectrum to transmit delay-sensitive data thanks to CRNs.
- When SUs are in short supply, the underused licensed and unlicensed spectrum bands may be used to improve video sessions for a variety of video-related applications such as video conferencing, video-on-demand, and online gaming. Any user may improve multimedia content performance by using underused spectrum resources by using CRs.
- CR-based wireless networks, such as the CR-smart grid, CRSNs, and others, may now be created and tested with a variety of multimedia services or applications. WMCRNs have grown more versatile in enabling a broad range of delay sensitive applications while addressing spectrum constraints by combining CR with various networks.
- Unlike conventional multimedia content users, WMCRN SUs may modify their multimedia and other communications needs in response to network circumstances.
- Multimedia apps use a lot of bandwidth. In comparison to other applications, they need greater data rates. With the assistance of WMCRNs, SUs may estimate desired data rates and then detect and assign idle channels that fit these rates effectively. CRNs for multimedia applications become more reliable as a result of this [11].
- WMCRNs may improve the performance of multimedia communication by using several channels and reusing them on a regular basis. Multi-user video streaming with numerous sessions is simple to accomplish with the assistance of various channels and frequency reuse [12].

3. DISCUSSION

CRNs are capable of supporting a wide range of multimedia applications. The majority of video applications are covered in the current work on WMCRNs. CRNs are adaptable enough to handle time-critical, delay-sensitive, and real-time applications. As a result, it may be used in medical, safety, and other traditional video applications to improve video or audio quality. Different WMCRN applications have been categorized based on the application scenarios and supporting infrastructure. WMCRNs applications have been categorized as video, medical, safety, VoIP, and heterogeneous based on application situations. The following are the details of the various CRN-supported applications:

3.1.Video Related Applications:

The need for video applications has grown as a result of the massive growth in portable mobile devices. To meet the growing demand for video applications, significant work has been done on the creation of additional network and communications infrastructure.

3.2. Safety Applications:

CRNs have also been used in a variety of safety applications. In civil safety applications, WMCRNs with various video or audio processing methods may be used. Vehicle safety is achieved via multi-media applications in CR-based vehicular ad-hoc networks. A new CR-based spectrum sensing method is suggested to offer the necessary bandwidth for delay sensitive safety applications. Spectrum allocation is examined with the assistance of the Nash bargaining method, while network fairness is maintained.

3.3. Medical Applications:

By using licensed and unlicensed spectrum resources, WMCRNs may also serve a variety of medical applications. In combination with CRNs, wireless medical telemetry is investigated. A CRbased medical telemetry design paradigm is presented to transmit patients' vital data to the

distant base station inside the hospitals with minimal latency. A spectrum measurement is carried out near hospitals in this research, and then the spectrum and power allocation are examined using CRs.

4. CONCLUSION

CRNs support a variety of delay-sensitive multimedia applications. Video streaming apps have been thoroughly examined. Other time-sensitive uses, such as medical and safety applications, haven't been thoroughly investigated. Include only medical and safety-related applications. Video conferencing and caching based on CRNs should be explored further using both QoS and QoE measurements. PSNR is the measure used to assess multimedia material in the majority of current work on WMCRN applications. When evaluating the performance of WMCRNs, other metrics like as MOS, jitter, and duration between interruptions should be considered. Existing WMCRN applications are primarily designed to enable multi-users and cross-layer compatibility. However, WMCRNs lack mobility, multi-hop, and multi-channel capability, all of which are required for the transmission of delay-sensitive real-time applications.

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STRUCTURE AND PHASE COMPOSITION OF THE NITRIDE-OXIDE COATING AFTER NITROOXIDATION

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ABSTRACT

With the aim of developing an industrial technology for nitrooxidation, we considered the production of a diffusion nitride-oxide layer on the surface of metal products by low-temperature gas nitriding at the first stage of saturation with nitrogen and sequential oxidation of the nitride layer in water vapor at the second stage of processing.For its further oxidation in water vapor, it is experimentally investigated to obtain a pore-free developed nitride layer depending on the nitrogen potential of the atmosphere upon saturation in an ammonia environment. The microstructures of the nitride - oxide layer were studied by nitriding at the first stage of the process in pure ammonia at below the eutectoid temperature for the "Fe-N" system and oxidation at the second stage in water vapor at a temperature below the eutectoid temperature for the "Fe-O" system.It was found that during oxidation, at the beginning of the process, denitrogenation occurs on the surface of the nitride layer with the formation of an oxide layer, which further prevents denitrogenation, acting as a barrier layer on the surface. Nitrogen from the high-nitrogen nitride phase continues deep into the surface with the formation of lower nitride phases with an increase in the thickness of the nitride phase, and at the same time diffusion occurs in the nitride zone of carbon from the steel matrix during decarburization.As a result of the oxidation of the nitride phase with oxygen from the saturating atmosphere and carbon from the steel matrix in the nitride layer, an oxycarbonitride phase is formed, which has the best physic mechanical and physicochemical properties. The change in the concentration of

elements along the depth of the layer and X-ray structural analyzes of the nitride and oxide phases are also given.

KEYWORDS:*Nitro Oxidation, Physic Mechanical, Oxy Carbonit Ride, DenitroGenation, Nitriding, Diffractometer, Electron Spectroscopy, Phases, Eutectoid Temperatures.*

INTRODUCTION

In the world mechanical engineering, various varieties of the nitriding process and combinations of nitriding with other methods of surface hardening are widely used.

For specific operating conditions, it is required to create a controlled diffusion nitrided layer with the formation of certain structural and phase components. The nitride zone resulting from nitriding is responsible for performance characteristics such as corrosion resistance, surface hardness, and corrosion resistance.

The structure and phases of the nitride layer, as well as the surface oxide film, obtained on the surface of steels and alloys after the combined process of gas nitriding and oxidation in superheated steam (nitrooxidation) depends on various factors, the main of which are the nitrogen potential, temperature and saturation pressure. In the process of nitrooxidation with a change in one or another of the above factors in the corresponding stages of saturation with nitrogen and oxygen, a nitride-oxide layer with predetermined properties can be formed on the surface of the work-piece to be hardened.

Prediction of the structure, phase and properties of the nitride-oxide layer obtained by low-temperature gas nitriding and subsequent oxidation of metal products is important for optimizing the nitrooxidation technological process.

METHODOLOGY

To study the nitrooxidation process at the first stage of saturation with nitrogen, technical ammonia was used, and at the second stage, superheated steam with the addition of film-formers (mainly ODEP, Trilon-B). The technology was carried out in a sequential scheme. Steel 40X was chosen as the material. We investigated the nitriding process at higher and lower eutectoid temperatures (591^0C) for the “Fe-N” system and oxidation at the second stage in water vapor at higher and lower eutectoid temperatures (570^0C) for the “Fe-O” system. The distribution of elements over the depth of the layer was determined by the method of Auger electron spectroscopy on an electronic spectrometer, and the microstructure of the layer obtained by various versions of hardening treatment was investigated using images taken on a JSM-25 scanning electron microscope (JEOL). The qualitative phase X-ray structural analysis of the layer was carried out on a DRON-3.0 diffractometer using cobalt and iron Kα-radiation.

RESULTS

One of the parameters of the nitrooxidation process for a detailed scientific description of the structure of the diffusion nitride or nitride-oxide layer is the composition of the saturating medium, which determines the saturation processes through the evolution of atomic nitrogen and carbon during nitriding, oxygen during oxidation.

Of all the known saturating media, the most dynamic are gaseous atmospheres, which make it possible to obtain any structural sets and a different range of depths of diffusion layers. In all cases of gas nitriding, ammonia is the basis for creating a saturating atmosphere.

Under certain thermodynamic conditions (temperature, pressure), ammonia dissociates in accordance with the reaction [1]:

$$NH_3 \rightarrow N + 3/2 \cdot H_2 \qquad (1)$$

In the process of saturation, a certain nitrogen potential is formed, and during the process, an equilibrium of the nitrogen potential occurs. According to the ratio (1), a certain part of atomic nitrogen, formed after the catalytic reaction, as a result of which the metal nitrides MeN are formed, occurs to the metal surface. Moreover, on the surface of metals or alloys, higher metal nitrides first develop in the order of decreasing nitrogen concentration along the depth of the saturated surface.

Equilibrium constants (K_a) can be used to estimate the ratio of the partial pressure of ammonia to hydrogen:

$$K_a = \frac{P_{NH_3}}{P_{H_2}^{3/2}} \cdot \frac{1}{a_N} \qquad (2)$$

Where: P_{NH_3} - partial pressure of ammonia;

$P_{H_2}^{3/2}$ - Partial pressure of hydrogen;

a_N - nitrogen activity or nitrogen potential.

During nitriding, a solid solution of nitrogen is formed in the α-Fe, γ′ and □ε--phases. At constant temperature and pressure, the equilibrium constant will be constant, therefore, equation (2) can be written in the following form:

$$a_N = \frac{P_{NH_3}}{P_{H_2}^{3/2}} \qquad (3)$$

To ensure the diffusion of nitrogen into the material, it is necessary that the nitrogen potential of the saturating medium be greater than the nitrogen content in the metal:

$$a_N^{\Gamma C} > a_N^{Me} \quad (4)$$

Equation (4) characterizes the initial stage of diffusion, since with the formation of a nitride layer (γ′- and □ε- phases), respectively, the value of the nitrogen potential must satisfy the condition:

$$a_N^{\Gamma C} > a_N^{\gamma'} > a_N^{\varepsilon} \quad (5)$$

During short-term nitrooxidation, the nitriding process first occurs with the formation of a nitride layer. In all cases, the formation of a nitride layer and a zone of internal nitriding in pure iron occurs in accordance with the “Fe-N” diagram [2].

Upon oxidation of the nitride layer, the ratio of the partial pressures NH_3:H_2 changes. The denitrogenation of the nitride layer begins with the formation of a thin surface oxide layer, which, after obtaining a certain thickness, prevents denitrogenation and forces the diffusion of nitrogen into the depth of the metal. As a result, during oxidation, the thickness of the low-nitrogen nitride layer and the zone of internal nitriding increase.

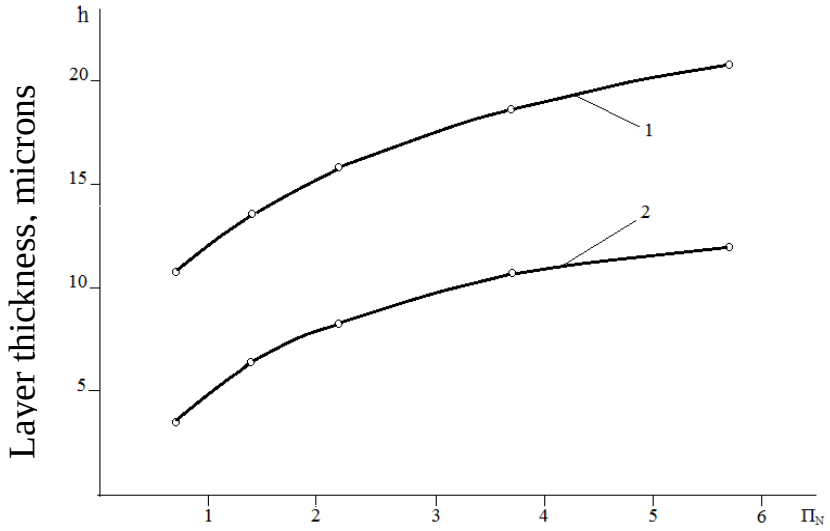
To develop the technology of the process and the theoretical foundations of the technology of nitrooxidation of low-alloy carbon steel, the dependences of the composition and structure of the nitrided and oxide layers on the chemical composition of steels and technological parameters of the process were studied. Technical iron and Steel 45 were used as an alloy.

For further oxidation in water vapor, it is necessary to obtain a given structure, phase composition and properties that best meet the requirements of the characteristics of the nitride

layer during nitriding. This circumstance poses the problem of choosing the nitrogen potential of the saturating atmosphere during nitriding in dissociated ammonia.

According to the theory of nitriding, regulation of the phase composition of the nitrided layer is achieved by changing the nitrogen potential of the saturating atmosphere [3]. By maintaining the nitrogen potential at the level of nitrogen solubility in one or another phase, it is possible to obtain a layer consisting of an α-solid solution, iron nitrides and alloying elements, to form a γ'-phase (low nitride) or ε'-phase with a low nitrogen content on the surface.

We studied the dependences of the change in the thickness of the surface diffusion layer depending on the change in the nitrogen potential of the saturating medium at a temperature of 5800C (Figure 1). The duration of the saturation process in all cases was 3 hours. Gas saturation was carried out with a change in the nitrogen potential in pure ammonia and the addition of partially dissociated ammonia, with the establishment of the required nitrogen potential in the furnace atmosphere.



1 — total thickness of the nitride layer; 2 - the thickness of the high-nitrogen ε-phase.

Figure 1. Changes in the total thickness of the nitride layer depending on the nitrogen potential of the atmosphere during nitriding in ammonia. Saturation temperature 580^0C, duration 3 hours.

With an increase in the value of the nitrogen potential, the thickness of the resulting diffusion nitride layer increases. Under the same conditions obtained, the samples were examined by X-ray diffraction analysis (Figure 2).

Analysis of the change in the diffraction maxima of the reflection of the phases shows that with an increase in the nitrogen potential in the nitride layer, the proportion of the ε-phase increases, and the fraction of the low-nitrogen γ'-phase and α-phase (internal nitriding zone) decreases. The optimal nitride layer in terms of the phase composition can be obtained at the values of the nitrogen potential: $2< \pi_N < 3$.

With an increase in the nitrogen potential $\pi_N >1$, a well-developed nitride layer is obtained on the surface, consisting of the ε'- and ε'+γ'–phases, with an increase in the nitrogen potential to $\pi_N <6$, the fraction of the γ'–phase in the nitride layer decreases, and ε'- phase increases.

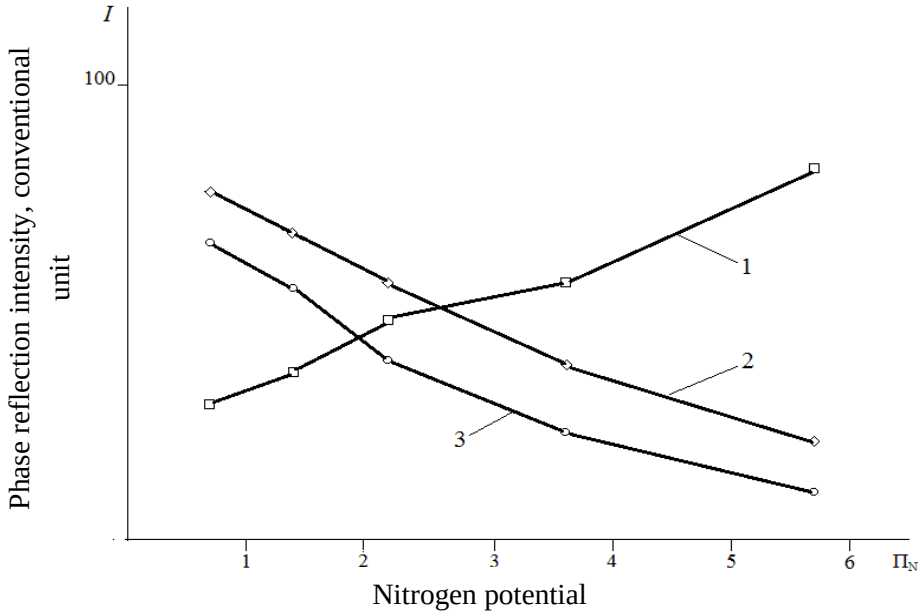


Figure 2 - Change in diffraction maxima depending on the nitrogen potential of the atmosphere during nitriding. Saturation temperature 5800C, duration 3 hours. 1- ε-phase (101); 2- γ'-phase (200); and 3 - ε'-phase (101). Radiation FeK$_\alpha$.

An increase in the thickness of the nitride layer prevents the diffusion of nitrogen through the nitride layer if the duration of nitriding is to be increased, as well as with an increase in the nitrogen potential π_N >5 due to an increase in the proportion of the high-nitrogen nitride layer, the brittleness of the layer and the porosity of the ε-phase are revealed.

In order to obtain a pore-free low-nitrogen diffusion nitride layer for further oxidation, it is desirable to obtain a low-nitrogen nitride layer consisting of a low-nitrogen ε-phase or a mixture of (ε+γ') - phases. The nitride layer formed upon saturation of the surface with nitrogen during the active period has a high concentration of nitrogen; at the second stage of saturation under conditions of a low nitrogen potential, until equilibrium is reached, it can dissociate in two directions: the process of nitrogen diffusion from the nitride layer into the metal and returned back to the external environment (surface denitrogenation process).

In the process of nitrogen diffusion from the nitride layer deep into the metal, the atmosphere in the furnace has no direct effect; in this case, the determining factors are the temperature and composition of the processed material (the presence of carbon in the matrix).

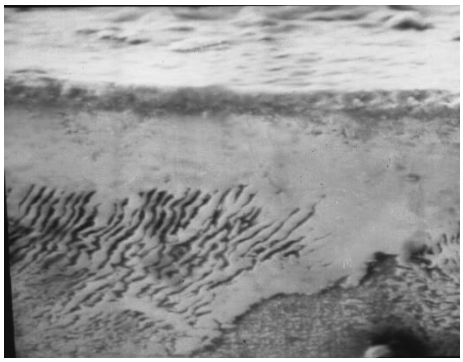
The process of returning atomic nitrogen from the nitride layer back to the external environment (into the furnace atmosphere) can be stopped by establishing in the furnace atmosphere by creating the necessary condition for equilibrium of the nitrogen potential with a decrease in the volume of ammonia supplied to the furnace or by creating a barrier surface layer preventing the denitrogenation process.

In connection with the above, the composition of the saturating atmosphere and the diffusion period can be varied within wide limits, which is determined only by the conditions for maintaining a high nitrogen concentration in the nitride layer, which does not require a large number of active atoms in the saturating atmosphere.

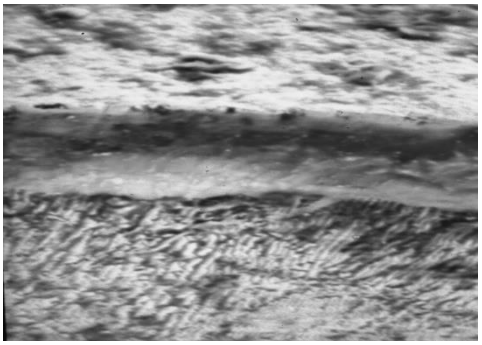
The formation of the ε'-phase occurs only during nitriding of steel and alloys in the presence of carbon in their matrix and has a carbonitride character. Therefore, a noticeable formation of this type of nitride is characteristic only during nitriding of carbon steel and alloys [4].

In order to obtain a complete picture of the change in the nitride layer during oxidation, samples of steel 45 were studied. The samples were processed in an atmosphere of pure ammonia at nitrogen potential values in the range $2< \pi_N < 3$, at a temperature of 5800C - below the temperature of the eutectoid for the "Fe-N" system and part The samples, without being removed from the furnace, were subjected to oxidation in water vapor at a temperature of 550^0C, below the temperature of the eutectoid for the “Fe-O” system. Micro-sections were made from the processed samples, and the distribution of elements along the depth of the oxide and nitride layers was studied.

Surface microstructures with a nitride-oxide layer of steel 45 after nitriding at the first stage at temperatures below the eutectoid for the “Fe-N” system (591^0C) and subsequent oxidation in complex-containing water vapor at a temperature below the eutectoid for the “Fe-O” system are shown in Figure 3.



a) x1000



b) x1000

Figure 3. Microstructure of the nitrooxidized layer on steel 45. Nitriding - 580 ° C, 3 hours: a - oxidation - 550 ° C, 1 hour; b - oxidation 2.5 hours.

During oxidation, the introduction of oxygen-containing complexones (film-forming agents) into the composition of the saturating medium, although in small amounts, favorably affects the formation of a surface oxide layer above the nitride layer, forming a uniform dense thin barrier oxide layer. The surface oxide layer, in turn, enters as a barrier layer prevents the denitriding process, while the higher nitride phases dissociate towards the internal nitriding zone with an increase in the thickness of the low-nitrogen nitride phase due to the high nitrogen concentration in the nitride layer (Figure 3, a). Dissociation of the nitride phase is especially noticeable with an increase in the holding time during oxidation (Figure 3, b).

X-ray diffraction analysis of the treated samples was carried out, which confirmed the presence of a developed γ'-phase, ε'-phase of a carbonitride nature, ε"-an oxycarbonitride phase, and at an oxidation temperature of 5500C the oxide layer consists of one Fe_3O_4.

After oxidation, due to denitrogenation of the samples, up to a certain depth, the nitrogen content is absent and an increase in nitrogen along the nitride depth is detected, due to the diffusion of nitrogen in the nitride zone.

During oxidation due to oxygen diffusion, denitrogenation and decarburization occur simultaneously in a part of the lower nitride zone. A layer of oxycarbonitride character forms on the surface (Figure 4).

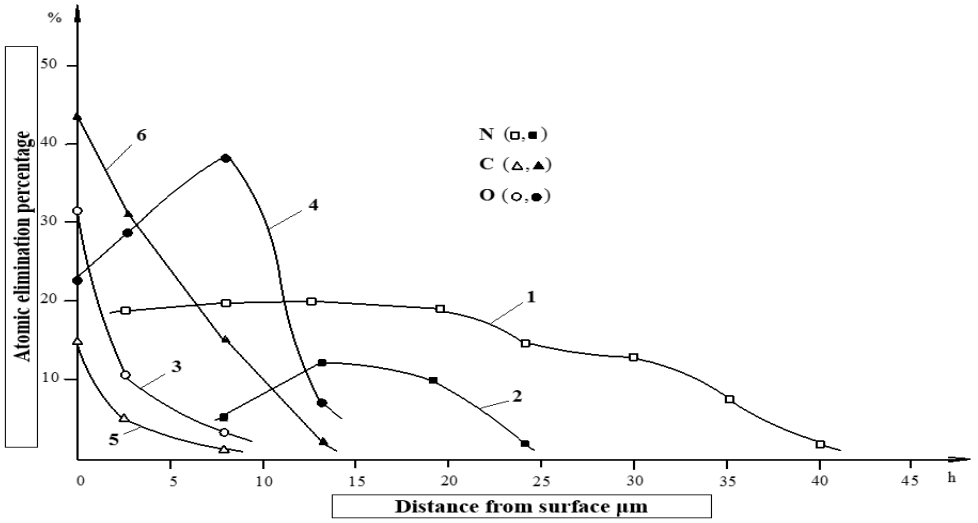


Figure 4. Distribution of elements in the nitride-oxide layer after nitriding: t=580^{0}C, τ=3 hours and oxidation t=550^{0}C, τ=1 hour (lines 1,3,5) and τ=2,5 hours (lines 2, 4.6).

CONCLUSION

Based on the results obtained, the following conclusions can be drawn:

- Nitride layer, for its further oxidation can be obtained at below eutectoid temperatures (below 591^{0}C) at nitrogen potential: $2<\pi_N<3$;

- During oxidation of the nitride layer, a dense oxide layer forms on the surface, which prevents denitrogenation;

- In the process of oxidation of the nitride layer, the thickness increases with the formation of lower nitride phases;

- In the process of nitrooxidation of structural and carbon steels, it is possible to obtain adjustable dense nitride-oxide layers, which are responsible for certain operating conditions.

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SOFTENING OF MUDDY CRUST FORMED AFTER PRICIPITATION IN COTTON FIELDS BY APPLICATION OF ENERGY AND RESOURCE_SAVING HARDENING SOFTENER AGGREGATE

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ABSTRACT

This article is edicated to the mechanization of agriculture and aims to help farmers by softening the muddy crust formed after rainfall in field farming by using an energy andresource_saving aggregate softener. Structural soil crusts are relatively thin, dense, somewhat continuous layers of non-aggregated soil particles on the surface of tilled and exposed soils. Structural crusts develop when a sealed-over soil surface dries out after rainfall or irrigation. Water droplets striking soil aggregates and water flowing across soil breaks aggregates into individual soil particles. Fine soil particles wash, settle into and block surface pores causing the soil surface to

seal over and preventing water from soaking into the soil. As the muddy soil surface dries out, it crusts over.

KEYWORDS: *Mechanization, Aggregates, Preventing, Especially, Germination, Seedling Emergence.*

1. INTRODUCTION

Structural soil crusts are relatively thin, dense, somewhat continuous layers of non-aggregated soil particles on the surface of tilled and exposed soils. Structural crusts develop when a sealed-over soil surface dries out after rainfall or irrigation. Water droplets striking soil aggregates and water flowing across soil breaks aggregates into individual soil particles. Fine soil particles wash, settle into and block surface pores causing the soil surface to seal over and preventing water from soaking into the soil. As the muddy soil surface dries out, it crusts over.

Structural crusts range from a few tenths to as thick as two inches. A surface crust is much more compact, hard and brittle when dry than the soil immediately beneath it, which may be loose and friable. Crusts can be described by their strength, or air-dry rupture resistance.

Recent rain brings another challenge for farmers, especially in fields conventionally tilled last fall or early this spring. In addition to potential soil erosion and damages to soil structure rainfall can cause, there are after effects of the rain when the soil surface starts to dry. The potential problem is soil crust. Soil crust is a product of a weak soil structure and the absence of residue or cover crop to protect soil surface from the intensity of rainfall.

This could occur especially in intensively tilled fields where residue cover is not adequate, as well as with fine texture soils and soils with low organic matter content. These conditions could increase the potential for soil crust formation. Residue cover plays a significant role in reducing soil crust by absorbing the impact of rain drops that destroy soil surface structure. The destruction of soil structure impacts plant germination and seedling emergence for both cotton and soybean.

Soil crusting can also result in poor growing conditions and reduced water infiltration. Cotton seedling emergence can be a problem if a dense surface crust forms. In this situation, hypocotyl is broken when pushing up against a solid crust. Monitor high-risk fields for soil crusting, especially where plant emergence has not yet occurred, in order to avoid damage to seedlings.

This crust will be broken up just before planting time. When seed is placed into the ground, the surface of the soil is generally thoroughly tilled using various pieces of equipment so that the seedlings can have the best possible start. Just when the seeds are about to emerge, the crust over the top of the seed bed is again broken up so that the new seedlings can pop through the surface of the soil to the sunlight and air so valuable to the new plant. Then, just before the first irrigation which comes later in the season, a tractor will again pass through the field dragging some type of implement to break up the crust down in the furrows. If these key management functions are not carried out, the seedlings could suffer. A reduced payday at the end of the season could be the result.

Figure 1: Soil crusting in heavy clay soils will often crack open as the soil dries.

Crust is a hard layer that forms on the soil surface after heavy rains and irrigation. In Central Asia, almost all soils in irrigated farming areas are prone to hardening. The main reason for this is the extremely low granularity of these soils and the fact, that the soil aggregates are very resistant to water. After rain or irrigation, the top layer of soil thaws, hardens when it dries, and the surface cracks. Hardening has a negative effect on soil properties and the development of agricultural crops, slows down water permeability and air exchange in the soil, as well as accelerates the evaporation of soil moisture (up to 20-30%). In fields with very thick loam, the germination of grass is delayed for 3-5 days and the number of seedlings decreases.

The process of sediment formation depends on the mechanical composition, type, cultural condition, salinity, and so on. The sediment is mostly formed in irrigated gray and desert soils. Its thickness and hardness depend on the severity of the mechanical composition of the soil. Particularly in heavy sandy, loamy, salty brown soils and bald soils with a mechanical composition, the layer is thick and very hard. Salinization and salinization increase the tendency to form crusts. The thickness of the layer is 0.3-0.5 cm in light gray soils with light sand and loam, 0.8-1.5 cm in light and dark gray soils, 2.4-4.5 cm in weakly saline sandy and loamy soils; the weight of a layer of soil on one m2 reaches 50-70 kg. Applying organic fertilizers to crops, sowing of siderite crops, chemical reclamation, crop rotation, granulation of soils, use of artificial polymers and mulching materials, etc. Implement measures to improve the physicochemical properties of soil, prevent stratification. Takesbefore the seedlings emerge, the field is softened with the help of light storms or rotary mowers. To minimize the effect of tillage, the crop should be treated (mowing or cultivating) with soil compaction between rows.

2. Procedure of research

Research work is being carried out around the world to develop new scientific and technical bases of resource-saving technologies and technical means for softening the crust in the fields planted with agricultural crops. One of the important tasks in this direction is the development of a constructive scheme of working bodies and substantiation of technological processes, quality of work and development of resource-saving working bodies in the process of interaction with the soil. At the same time, it is necessary for the cotton cultivator to develop disk working bodies that soften the layer at the required level without damaging the cotton seedlings. Extensive measures are being taken in the agricultural production of the Republic to save resources, cultivate agricultural crops on the basis of advanced technologies and develop high-efficiency agricultural machinery [1,2]. The Action Strategy for the further development of the Republic of Uzbekistan for 2017-2021 includes, among other things, “Modernization and accelerated development of agriculture, further improvement of the reclamation of irrigated lands, development of reclamation and irrigation networks, intensive methods of agricultural production, especially water and resources. Introduction of modern saving agro-technologies, use of high-yielding agricultural machinery,one of the important tasks in the implementation of these tasks.In particular, the maintenance of agricultural crops and the technical and technological renewal of mitigation equipment after rainfall is a topical issue today. [3].

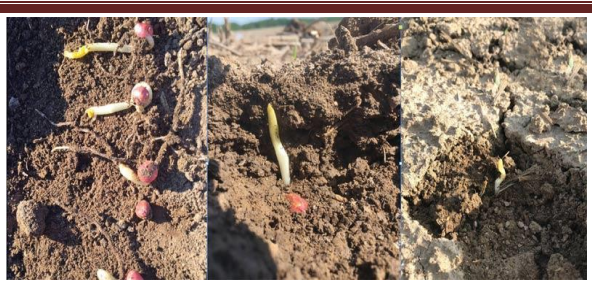

Figure 2: Sprouting of cotton in a stagnant field

Irrigated lands in cotton-growing areas are focused on natural-climatic and soil conditions, mechanical composition of soil, tillage technology, machine types and agro-technical requirements. In the early development of agricultural crops should be provided with soil, air, heat environment for the growth of young seedlings. The onset of spring rains prevents the young seedlings from growing, developing, and sprouting, that is, the rain turns the soil into a muddy layer and prevents the sprouting seedlings from developing by squeezing the roots. Our farmers try to create a comfortable environment by mowing the lawn, but it takes a lot of time and physical effort. Mechanized complex cultivation, on the other hand, takes a long time and prevents the fine compaction of the resulting hard soil, as well as the formation of lumps.

3. Results of research

The proposed utility model applies to the field of agricultural mechanization, in particular the process of primary processing between rows. The structure of the new device will consist of the following. A metal profile with a total length of 3.5 meters (1), 4 handles (2) are welded, one (3) working body is mounted on each handle. This means that when each working body processes cotton seedlings sprouted from one row, it is possible to further increase the number of rows with a total processing capacity of up to 5 rows. We determine the width of the unit depending on the power of the tractor. Tractors with 80-100 horsepower can handle up to 8 rows. The main part of the working body is mounted on small frames prepared by welding (4) with soil softening fingers (5). The softening fingers are attached to the small frame by means of rotating hinges or bearings. From the forward motion of the traction tractor, the softening fingers rotate and rub the fold (Figure2).

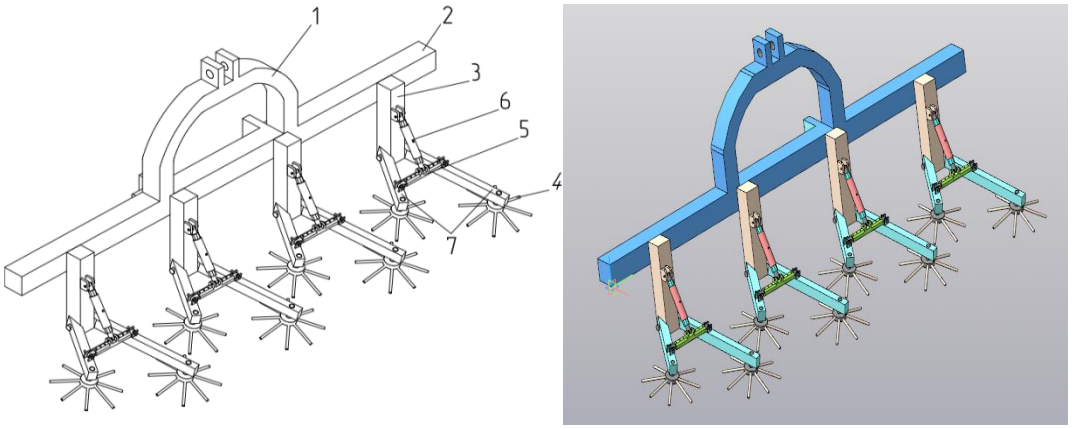

Figure3: Schematic diagram of the solidification device

As for the technology of operation of the unit, the device aggregated on the tractor TTZ-80 is adjusted for processing the grids by means of adjustable traction. It is necessary to ensure that the working body is parallel to the grid and lies flat on the ground, otherwise the quality of the processed field will not be good.


a)

b)

Figure 4: The appearance of the working bodies of the hardening device in the process of work.

It should be noted that the range of 0.18-0.48% damage to cotton seedlings meets the initial requirements. Therefore, on the basis of the above data, it can be said that the diameter of the toes should be in the range of 200-250 mm for quality softening of the layer at the required level with minimal damage to cotton seedlings. (Figure 3)

4. CONCLUSION

By using this device, the quality of work can be improved by reducing the consumption of metal, energy and fuel consumed in the process of softening the coating.

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ON SOME CHARACTERISTICS OF REPEATING UNITS

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ABSTRACT

The repetition concept is used to refer to the reuse of certain words and elements in order to reinforce, emphasize, or increase the language meaning. In repetition research it is suggested that research on these units dates back to the 5th century BC. In modern linguistics, repetitive units are mentioned as a means of forming a text. Some scholars consider repetitive units assesses as waste words, redundancy. Most educators, however, they put forward different views. They see repetition in education as a basis for learning and a means of communication. A unit that is repeated in a text or verbal thought communicates with the same elements in the brain and and try to justify the idea that it facilitates the understanding process. Especially, the poem's chorus, rhyme, and rediff repetition emphasizes that they are important units in ensuring that the text is remembered. The article discusses the repetition role in the environment, in our lives, in literary texts, and its importance in our communication.

KEYWORDS: *"Kholdorkhan" Epic, Repetitive Units, Epics, Lingvofolkloristic Approach.*

INTRODUCTION

The repetition concept is used to mention the reuse of certain words and elements in order to reinforce, emphasize, or increase the language meaning. Repetition and repetitive literature exist not only outside the text but also in the inter-body relations in the world around us. Even in every aspect of our lives we encounter it as a rewarding tool that provides consistency and eliminates complexity. İf we don't take into account the universe, we can always find the beauty around us. In textiles, both the lining and the pattern are the result of repetitive activities and procedures. Repetitive motifs in jewelry represent unique art works. Repetitive forms and rules makes the life complexities easy. Repetitive forms and concepts are quickly remembered. In short, more broadly, the sublime order that underlies the universe is based on repetition. From this point of view, it is clear that the repetition concept is not just a word repetition. İn a broad sense repetition is the the concept name and man and the universe existence.

The variety of types and functions of linguistic repetitions has recently attracted the attention of many leading Russian researchers I.V.Arnold, M.Y.Blokh, O.A.Dobizha, E.A.Ivanchikova, R.A.Vafeeva and others. Repetition as a reality of a functioning language system is considered by scientists from different positions. As a grammatical means of the language E.I. Ivanchikova,

L.V.Lisochenko and others, as a means of expressive-stylistic A.N.Kozhin, G.G.Khazagerov and others, as a violation of the language norm of I.V.Formanovskaya.

Repetition research suggests that the first known source about these units belongs to the Lithuanian Gorgias, who lived in the 5th century BC. (Tannen, 1989: 128) In modern linguistics, repetitive units are mentioned as a means of text forming. But not everyone agrees with this concept. Some scholars consider repetitive units to be words waste (Sienkiewicz 1984: 205) and redundancy (Casares 1959: 350). Many educators, however, take a different view. They see repetition in education as a basis for learning and a means of communication. They try to justify the idea that the unit repeated in the text or in the spoken word communicates with the same elements in the brain and facilitates the comprehension process. In particular, the poem's chorus, rhyme and rediffrepetition emphasizes that they are important units in ensuring that the text is remembered. In fact, such units are not wasteful or redundant units, but elements that ensure the text integrity.Repetitive units play a special role in overcoming so-called “background noise” inconvenience in pedagogy.That's why K. Weils emphasizes that duplicate units should not be taken from bad side. Here, the "background noise" concept refers to a situation that can be explained in a few words and phrases. It emphasizes the appropriateness of using a unit repetition known to the student or listener to get out of this situation. In this sense, the English linguist K. Weils argues that repetitive means can be a successful means of communication and a motivation element in communication. At the same time, he notes that the literature serves to demonstrate live speech style. (Weils 1997: 395)

Like other researchers, she considers the most common repetition to be a reprise, by which she understands a simple repetition of a word or a group of words immediately following each other. For example: *coeur battait battait tres fort a sa parole*. Repetition couples occupy important positions in a poem or phrase and combine two or more syntactic unity. These include: anaphora, epiphora, chain, cases of their combination, as well as a refrain.

The chain is a repetition, the first element of which ends the sentence, and the second begins the next, etc. For example:

Le ciel etait de nuit La nuit etait de plainte La plainte etait d'espoir.

British researcher D. Tannen noted that repetition in communication is a "convenient means of obtaining information": “Repetitive words are important tools for learning and remembering information.” D. Tannen also noted that repetition is an indispensable means of folklore. (Tannen, 1989: 137) There is an isotope term in chemistry. In recent years, the term isotope has also been used in research in textual linguistics. It is used to describe two or more similar elements relationship that form a common semantic center.

The units repeated in the following passages appear in different text parts, emphasizing the spatial “wedding invitation” breadth that is the text purpose, while enhancing the isotopic text nature:

I sent an application to the Turkmen people,

Listen to Holdorkhon's language,

Let the hatim go straight to the people of Chambil,

Let Beck Gurugli come to Holdor's wedding.

When a horse gallops,

Our people have the love of the state,

I told the people of Taka-Yovmit,

Holdorkhon has a big wedding.

Heard the cry of Holdorkhon,

I told everyone about the wedding, Yovmit-Taka,

Don't come to the big wedding with a handkerchief,

Gurugli crowned as the head.

The poor, the poor, the poor,

Anyway, that's it: I told the guys,

Crowds, don't drink beer,

Taka-Yovmitelni is a young man.[1]

The number of lexical repetitions used in the passage from the epic "Kholdorkhon" in Ergash Jumanbulbul oglu repertoire, a great representative of the Uzbek thought school, is as follows:

Nation (5), *Kholdorkhon* (4), *wedding* (4), *do not stay* (4), *have* (3), *Gulugli* (2), *horse* (2), *Taka-Yovmit* (2), *large* (2).

It is obvious that the repeated words serve to keep the rhythmic-intonational text aspect as a whole, while semantically emphasizing certain values and traditions. For example, the fact that the word nation is used the most in the passage indicates that in a sense, large-scale events have long been held as a group and held together. We believe that, the fact that the largest event in the region is a wedding, the proposals repetition and various assertions, in a sense, also reflects the national mentality associated with holding similar ceremonies.

In the text formation, repetitive units also serve to ensure syntactic parallelism and semantic coherence. (Korobeinikova, 1996: 32) One of the most important repetitions features is the ability to easily connect different points, to build a strong connection. Researchers also say that repetition is a means of maintaining the internal text harmony: “Perhaps the most notable aspect of repetition is to ensure that the tone within the text is consistent.” (J. Sülük, 1981: 323) when talking about the important repetition aspects, researchers often mention that repetitive units serve to draw the reader's attention to a particular text part.

Repetition in the literary text is always seen as a means of shaping the text, as a unit that enhances the expression effectiveness and completes the melody. What you need to pay attention to is the distance between the repeating units. The more orderly the repetitive elements, the more rhythmic and intonational the text. Usually, repeated words and other elements fill a rhythmically-semantically "empty" space. Close-up repetitions are designed to keep the text rhythmically active. Long-distance repetitions serve to clear, refresh, and strengthen the reader or listener memory. In addition, long-distance repetitions serve as a guide for the reader in the complex text. In this sense, long-distance repetitions form the text semantic and structural core.

The concept of repetition is used to refer to the re-use of certain words and elements in order to reinforce, emphasize, or increase the meaning of a language. Repetition and repetition exist not only in the literary text, but also in the inter-body relations in the world around us. We even encounter it in every aspect of our lives as a rewarding tool that provides consistency and eliminates complexity. Even if we don't take into account the universe, we can always find the beauty that is created around us. In textiles, whether you say fabric lining or pattern, it is all the result of repetitive activities and procedures. Repetitive motifs in jewelry represent unique works of art. Repetitive forms and rules ease the complexities of life. Repetitive forms and concepts are quickly remembered. In short, the broader order that underlies the universe is based on repetition. From this point of view, it is clear that the concept of repetition is not just the

repetition of a word. Repetition, in the broadest sense, is the name of the concept and existence of man and the universe.

Repetition in the literary text is always seen as a means of shaping the text, as a unit that enhances the effectiveness of expression and completes the melody. What you need to pay attention to is the distance between the repeating units. The more orderly the repetitive elements, the more rhythmic and intonational the text. Typically, repeated words and other elements fill a rhythmically-semantically "empty" space. Short-distance repetitions are intended to ensure the rhythmic activity of the text. Long-distance repetitions serve to clear, refresh, and strengthen the memory of the reader or listener. Long-distance repetitions also serve as a guide for the reader in the complex text of the text. In this sense, long-distance repetitions form the semantic and structural core of the text.

In a word, the role of repetition in the language of the epic is incomparable. According to observations, in the style of artistic speech and in the oratorical style, some types of repetitions appear in conjunction with other types of repetitions and with other stylistic devices. An example of syntactic repetition followed by lexical repetition has already been given above. The most common combination of various structural types of lexical repetitions. Anaphora is often combined with an epiphora, thus forming a ring. The pickup is often accompanied by a simple reinforcing repetition. Multi-union almost always entails syntactic repetition.

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IMPACT OF SPORTS AND ENERGY DRINKS IN ATHLETES FOR PERFORMANCE BASED ACTIVITIES

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ABSTRACT

Athletes use sports drinks, also known as electrolyte drinks, as a functional beverage that helps them replenish lost fluids, electrolytes and energy before, during and after a workout or competition. However, the effectiveness of sports drinks in improving athletic performance has been called into question. When taken excessively or incorrectly (as with the majority of nutritional supplements), they may be harmful to one's health or performance. Certain people may be allergic to the beverages or some of the components, so they should avoid them. Sports drinks are a great method to stay hydrated while also satisfying your thirst. The electrolytes and carbs in sports drinks help you recover faster after an exercise than ordinary tap water. Additionally, they may include stimulants such as caffeine or even protein to help you perform better throughout your workouts. Exercise and high-energy activities such as sports enhance endurance and performance when sports drinks are consumed. You'll recover more quickly and have more energy the rest of the day if you drink a sports drink after your exercise.

KEYWORDS: *Sports Drink, Sports Aqua, Sports Activities.*

INTRODUCTION

Sports drinks, on average, have a sugar content that is two-thirds that of a soda. Even with the added sugar in sports drinks, the daily sugar allowance for children is still too high. The electrolytes in sports drinks are touted, but they are of little use if the body is already getting them through proper diet. Electrolytes are used to replenish the body's supply of ions, which are used in muscle contractions and nerve impulses throughout the body. Water is a better transporter for salts than any other beverage, thus the efficacy that sports drinks claim is unneeded for normal physiological functioning and may damage owing to the high sugar content. Electrolytes are also known as "salts" in the scientific community.

The salt and sugar contents in isotonic sports drinks are comparable to those found in the human body. The salt and sugar content in hypertonic sports drinks is greater than in human blood. Unlike human blood, hypotonic sports drinks don't have as much sodium or sugar as normal.

Most sports drinks include between 4 and 5 heaped teaspoons of sugar per eight-ounce portion (13 to 19 grammes per 250 ml) and are thus roughly isotonic.

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Figure 1 : Sports Drinks and Water

Sweating and spending energy cause athletes who are actively training and competing to lose water and electrolytes. However, according to University of New Mexico exercise physiologist Robert Robergs, who researched Gatorade, unless someone is exercising or participating in a sports event for more than 90 minutes, there is no need to drink anything with too much sugar and electrolytes. Robergs says. This may create "gastrointestinal issues or additional disruption of fluid balance," according to the Australian Institute of Sport, and can also lead to salt-induced cramps.

Hong Kong shoppers bought Lucozade (on the left). It was first promoted as a sick person's energy drink in the UK in 1927, according to pharmacist William Walker Hunter. For athletes who have been active for more than four hours, a sports drink containing sodium may be suitable to aid recovery after an intensive and extended period of training or competition to prevent hyponatraemia (low sodium).

Sports drinks, which offer a significant amount of energy from sugars in the form of calories, claim to help athletes perform better and last longer. Most of the 431 marketing claims of performance improvement that were examined by Matthew Thompson and colleagues from the University of Oxford's Centre for Proof-Based Medicine provided no evidence. In the case of GlaxoSmithKline's Lucozade, 174 sources were mentioned, but only three studies were judged to be of good quality and low bias risk by Thompson's team. Those rigorous trials that did indicate an increase in endurance were "of limited significance to most individuals since the assessments were on top athletes," according to the authors. According to Thompson, consuming these drinks "may totally offset exercising more, playing football more, going to the gym more" for the overwhelming majority of individuals.

Drinks advertised as "soft drinks" are what they are: soft drinks. According to the soft drink industry's reaction to the Oxford study, "Sports drinks can encourage individuals to exercise more by enabling those engaging in sport to perform better and recover more rapidly.

Weight gain may occur if you consume sports drinks containing carbs without engaging in strenuous activity. According to research presented at the Obesity 2012 scientific conference by the Obesity Society, adolescents gained an average of 3.5 pounds (1.6 kg) over the course of two years for every bottle of sports drink they drank on average. Scientist Alison Field of Harvard Medical School was startled to discover that "Sports drinks had an even greater connection with weight gain than sugared sodas," according to the study's main author. According to a University

College London research published in August 2019, the high sugar content in sports beverages was contributing to elite athletes' increased risk of tooth decay.

Caffeine is an ingredient in several of these beverages, and large doses may be hazardous. Caffeine, on the other hand, may be helpful if taken in moderation (but other negative effects may still arise).

Traditional Use of Sports Drinks

Athletes drank low-alcohol beer to replace their bodies' water, minerals, and vitality in the 19th and early 20th centuries. The beer was a better choice since it was made using 780anitized water that was boiled throughout the brewing process. However, research shows that even a little amount of ethanol affects endurance performance by inhibiting hepatic glucose production and impairing psychomotor abilities including response speed, hand-eye coordination, and balance.

Energy drink

Figure 2 : Energy Drinks

Caffeine, the primary stimulant in energy drinks, is promoted as offering both mental and physical benefits (marketed as "energy", but distinct from food energy). They may be carbonated or not, and sugar, other sweeteners, herbal extracts, taurine, and amino acids can all be included. They can also be left unflavored. As a class, they fall under the umbrella term "energy foods," but they are different from the broader term "sports drinks," which are marketed to improve athletic performance. This beverage category has a large number of manufacturers and variations.

Natural caffeinated beverages such as coffee, tea, and others are not often categorised as energy drinks. Coke and other soft drinks with caffeine aren't energy drinks either. Caffeine and other stimulants may be found in alcoholic beverages like Buckfast Tonic Wine. The Mayo Clinic says that a daily intake of 400 mg of caffeine is safe for a healthy adult. These findings were backed up by a panel of the European Food Safety Authority, which likewise found no safety issues with people consuming up to 400 mg of caffeine daily. It's the same as 4 cups of coffee (90 mg each) or 2 1/2 standard cans of energy drink (160 mg each/80 mg per serving), according to the ESFA's calculations.

Caffeine and sugar are the primary components in energy drinks, but there is little or no evidence to support the claims made for the other ingredients. Caffeine is mainly responsible for most of the benefits of energy drinks on cognitive function, such as enhanced attention and response time. According to other research, these gains in performance are due to the synergistic effects of the active substances. The most common claims made in energy drink advertising are about enhanced muscular strength and endurance, however they are unsupported by scientific evidence. Many health concerns have been linked to energy drinks, including higher injury rates when coupled with alcohol and cardiac and mental problems if used excessively or repeatedly. Youth, caffeine-nave or caffeine-sensitive individuals, pregnant women, competitive athletes, and those with underlying cardiovascular disease are at risk of problems from energy drink use.

Caffeine and other chemicals in energy drinks are promoted to youngsters. These beverages offer health advantages in addition to the caffeine's effects. The majority of medical professionals believe that caffeinated energy drinks enhance alertness. Many students in high school and college mix alcoholic beverages with energy drinks to get the party started. Recently, the alcohol industry has come under fire for its promotion of alcohol and energy drinks as a unitary product. When these two factors are present in college students, it increases their chance of developing alcohol use disorders and other health problems.

Even while energy drinks are often marketed as having distinct advantages, there is no solid evidence to support the claim that other components offer additional benefits. Supplements in energy drinks may claim to offer health advantages like vitamin B12, however no scientific evidence has been found to support the idea that supplements may improve health in otherwise healthy individuals. For example, Red Bull and Monster have marketed their energy drinks by claiming that they "give you wings," are "scientifically designed," or are a "killer energy blend." With manufacturers sponsoring or advertising at extreme sports events and music festivals and targeting a young audience via social media platforms, the marketing of energy drinks has been especially aimed towards adolescents.

Energy drinks are often combined with alcohol and enjoyed in social situations as a prepackaged caffeinated alcoholic drink, a mixed cocktail, or simply as a drink drunk with alcohol.

Austrian Power Horse energy drink packaging includes a warning about caffeine. Caffeine and sugar are the primary components in energy drinks, but there is little or no evidence to support the claims made for the other ingredients. Caffeine is mainly responsible for most of the benefits of energy drinks on cognitive function, such as enhanced attention and response time. There is minimal scientific evidence to back up claims of enhanced muscular strength and endurance in energy drink advertising.

The European Food Safety Authority deems a caffeine consumption of 400 mg per day (for an adult) to be safe (EFSA). Nervousness, irritability, insomnia, increased urine, irregular heart rhythms (arrhythmia), and dyspepsia are all side effects of caffeine intake higher than 400 mg. Pupil dilatation has also been linked to heavy drinking. [a reference is required] For food, unlike medicines, the caffeine dose is not needed to be listed on the product label. Nevertheless, the caffeine level of most beverages is included on the label regardless of this, and some activists are asking the FDA to alter this practise.

Increased alcohol-related damage is possible when caffeine and alcohol are consumed together. Alcohol may be disguised by energy drinks, leading a drinker to overestimate their degree of drunkenness. The combination of a stimulant (caffeine) and a depressant (alcohol) delivers conflicting signals to the neurological system and may lead to increased heart rate and palpitations since both substances are diuretics. Despite the fact that many individuals choose to consume alcoholic energy drinks in order to combat alcohol intoxication, others do so in order to mask the taste of alcohol in their mouths. But the EFSA determined in 2015 that "Consumption of additional components of energy drinks at amounts typically seen in such beverages would not alter the safety of single doses of caffeine up to 200 mg." In addition, the EFSA says that drinking alcohol, which results in a blood alcohol level of approximately 0.08 percent, will not impact the safety of caffeine dosages up to 200 mg. Even at this doses, caffeine will not be able to conceal the subjective feeling of drunkenness.

High caffeine and sugar intakes from energy drinks, especially in children, adolescents, and young adults, may have negative health consequences. Teens' sleep habits may be disrupted and their risk-taking behaviour may rise if they consume too much energy drinks. If you consume too many energy drinks, you run the risk of developing cardiac issues like arrhythmias and heart attacks and mental health problems like anxiety and phobias. Sugar and caffeine-containing

sports beverages have been linked to athlete fatalities in Europe. More study and government control are required, according to studies that show caffeine concentration is not the sole issue and that the combination of additional chemicals in energy drinks makes them more hazardous than beverages that simply include caffeine as a stimulant.

Visits to the emergency department (ED) may be on the rise, according to recent data. Energy drink use was associated with 1,494 emergency department visits in the United States in 2005; however, by 2011, energy drink use was connected to 20,783 trips to the hospital. This spike in emergency room visits was driven mostly by males, who were more likely than women to seek medical attention. According to current research, unpleasant responses to alcoholic beverages are the leading cause of visits to the emergency room. There were 14,042 hospitalizations in 2011 as a result of energy drink use. These caffeinated beverages, when abused, lead to a large number of trips to the emergency room. A total of 6,090 trips to the ED were made because to the beverages' overuse or abuse by 2011. The researchers found that 42 percent of patients had combined energy drinks with another stimulant, whereas the remaining 58 percent had just taken the energy drink. Energy drinks, according to some research, may serve as a gateway drug.

Caffeinated energy drinks are not recommended for children by the American Academy of Pediatrics.

Variants

In the world of energy drinks, energy shots are a specific subcategory. Energy shots are offered in smaller 50ml bottles, as opposed to the larger cans or bottles that most energy beverages come in. Caffeine, vitamins, and other useful components included in energy drinks may be found in concentrated form in energy shots, making them comparable to their larger-sized counterparts. Instead of encouraging consumers to drink a full can of high-calorie energy drinks, the promotion of single-serve energy shots emphasises the convenience and availability of the low-calorie "instant" drink in one swallow (or "shot"). 5-hour Energy, a popular energy shot, combines B vitamins and caffeine at a dosage equivalent to that of a cup of coffee.

Red Bull and other caffeinated beverages such as rum and coke are frequently combined with energy drinks like Red Bull to create Vodka Red Bull, which has a higher caffeine content than rum and coke. The Jägerbomb or the F-Bomb – Fireball Cinnamon Whisky and Red Bull — are two examples of this shot's bomb configuration. Some nations also sell a broad range of caffeinated alcoholic beverages. Products made in the United States Before the U.S. outlawed caffeinated alcoholic beverages in 2010, Four Loko and Joose were the first to mix caffeine with alcohol.

TABLE 1 : KEY PARAMETERS AND FACTORS

	Gatorade	**Staminade**	**Powerade**	**Gatorade Endurance**	**Powerade Zero**	**Maximus**
Energy	1030kJ	1060kJ	1290kJ	1080kJ	68kJ	1300kJ
Protein	0g	0g	0g	0g	0.5g	<1g
Fat – total	0g	0g	0g	0g	0g	<1g
Saturated	0g	0g	0g	0g	1g	<1g
Carbohydrate	60g	60g	73g	62g	1g	74g
– sucrose	55g	44g	57g	57g	0g	60g
– glucose	5g	16g	6g	5g	n/a	16g

Sodium	23mg	379mg	280mg	840mg	510mg	300mg
Potassium	225mg	186mg	141mg	392mg	n/a	300mg
Magnesium	n/a	29mg	n/a	14mg	n/a	40mg
Calcium	n/a	–	n/a	27mg	n/a	20mg

Caffeine, B vitamins, carbonated water, and high-fructose corn syrup or sugar are common ingredients in energy drinks (for non-diet versions). There are also a variety of ginseng, maltodextrins, inositols, carnitines, creatines, glucuronolactones, sucraloses, and other supplements including guarana, yerba mate and açа as well as taurine and ginkgo biloba. Non-diet energy drinks include sugar, which is a source of dietary energy; however, there is no evidence to suggest that the inclusion of additional components has any negative health effects.

Caffeine levels in energy drinks in the United States vary from 40 to 250 milligrammes (mg) per 8 fluid ounce (237 ml) serving. According to the FDA, the safe daily dose for adults is 400 mg, while the hazardous daily dose is 1200 mg.

Energy drinks are popular among teenagers and young adults all around the world. According to one research, young people aged 20 to 39 take 227 milligrammes of caffeine daily, compared to their non-consumer peers who only consume 52.1 milligrammes of caffeine daily.

Trends in Market Reports

Global sales of energy drinks amounted to about 44 billion euros in 2017. By 2021, it is expected that the US energy drink industry will be worth $19 billion. Hispanics and 18–35-year-old men fueled the category's expansion through 2016. While energy drink formulas continued to be refined in 2017, producers lowered the sugar level and caloric content, while adding "clean" labels to indicate the usage of all-natural or organic components, as well as flavours and additives that may influence mood.

Regulations

A case against the ban was filed in 2004 and won by the European Court of Justice. For a while, Red Bull was prohibited in Norway, however this ban has since been lifted. Selling in Norway was made legal in May of that year. The vitamin B6 content has been decreased in the Norwegian version. The drink was studied in the UK, but only pregnant women and children should consume it.

Colombia banned the sale and marketing of energy drinks to children under the age of 14 in 2009 under the Ministry of Social Protection. Energy drinks were declared "inappropriate in a Muslim culture" by Chechnya's President Ramzan Kadyrov in November 2012, who ordered his administration to draught legislation prohibiting their distribution as a kind of "intoxicating substance." In 2012, one person died and 530 others were admitted to the hospital as a result of "poisoning" from the drinking of such beverages, according to Kadyrov's claims. Gennady Onishchenko, Russia's Chief Sanitary Inspector, had a same opinion.

A school in Hove, England asked local businesses not to offer pupils energy drinks in 2009. "This was a preventive step," said headteacher Malvina Sanders, "since all research indicates that drinking high-energy beverages may have a negative effect on young people's ability to focus in class." A deal was worked out by the school and signs were put up at their neighbourhood Tesco urging kids not to buy the items they were selling. A school in Oxted, England, took similar steps, banning pupils from drinking alcoholic beverages and sending letters home to parents.

Energy drinks may only be sold and manufactured in specific countries. 'Formed caffeinated beverages' (energy drinks) in Australia and New Zealand are controlled by the Australia New

Zealand Food Standards Code, which sets the caffeine content limit at 320 mg/L (9.46 mg/oz) and the caffeine level in soft drinks at 145 mg/L (4.29 mg/oz). Caffeine labelling is required for all guarana-containing foods in Australia, and the labels on energy drinks there advise people not to drink more than two cans a day of the product.

Some energy drinks, such as Monster and Rockstar, have reportedly rebranded their goods as beverages rather than dietary supplements as of 2013, according to reports in the United States. Food stamps may be used to buy certain beverages, which are exempt from F.D.A. reporting rules for fatalities and injuries and can be bought with them, although the cans must identify the contents.

By banning the sale of energy drinks under the age of 18, Lithuania became the first EU nation to do so. An investigation into the popularity of energy drinks among teenagers prompted the Baltic state to impose the ban. The AFP estimates that 10% of school-aged Lithuanians use energy drinks on a weekly basis.

In June 2016, Latvia prohibited the sale to minors of caffeine- or stimulant-containing energy drinks, such as taurine and guarana. Many British shops began banning the sale of energy drinks with more than 150 milligrammes of caffeine per litre to those under the age of sixteen in January of this year.

Alcoholic energy drinks (also known as caffeinated alcoholic beverages) are illegal to sell in certain areas because of the prepackaged nature of the drinks. Marketers may alter their goods' formulas in reaction to restrictions.

Prominent Sports Drinks

- Commercially available sports drinks include:
- 100plus
- 10-K Thirst Quencher
- Accelerade
- All Sport
- Aquarius
- Bodyarmor
- Herbalife H3O Pro
- Isostar
- Lucozade Sport
- Muscle Milk
- Pocari Sweat
- Powerade
- Sqwincher
- Gatorade
- Vemma Thirst
- Vitamin Water

CONCLUSION

All athletes must be well hydrated in order to perform at their best. Athletes who establish a regular routine for staying hydrated recover faster and have more energy. An athlete's body can transfer nutrients and oxygen to active muscles, reduce lactic acid buildup, eliminate nitrogenous waste, and regulate body temperature better if they're well hydrated. Slight sweat weight loss may have a negative impact on an athlete's performance because of the reduced blood volume and less-than-optimal use of nutrients and oxygen that results. Sports drinks have undergone considerable testing and are usually considered superior to plain water for physically demanding individuals. Due to the efficiency with which energy is transferred to tired muscles during intense aerobic activity, carbohydrate is the body's preferred fuel source (rather than protein or fat). In order to reduce stomach discomfort and increase intestine absorption for the supply of energy to muscles, most sports drinks are designed to provide carbs, electrolytes, and water.

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A REVIEW OF THE SEMANTIC WEB APPROACH TO BIG DATA INTEGRATION

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ABSTRACT

The World Wide Web Consortium (W3C), an international standards organization for the web, promotes Semantic Web. It's a more advanced version of the existing web that makes it simpler to find, reuse, combine, and distribute data. As a result, the Semantic Web is seen as a cross-platform integrator of information, data applications, and frameworks. Today's big data is often referred to as having three Vs: volume, variety, and velocity. The term "variety of data" refers to how to cope with diverse data formats and a large number of distinct data sources. As a result, large data variety challenges are critical for resolving a wide range of real-world issues. The semantic web is used as an integrator to combine data from multiple sources and formats, such as online services, relational databases, and spreadsheets. Because of the variety of the data, this task poses a number of challenges that may not be completely resolved with the current approach. This article attempts to concentrate on the many difficulties that come with integrating data from various kinds of sources, as well as how various semantic web technologies and tools are utilized to bring disparate data together.

KEYWORDS: *Big Data, Disparate Data, Information Extraction, Semantic Web, World Wide Web.*

42. INTRODUCTION

Big data is described as having three key characteristics: volume, diversity, and velocity, as shown in Fig. 1. The term "volume" refers to the problem of managing large data sets, which usually necessitates the use of a cloud-based platform. Velocity refers to handling continual gushing information, such as video feeds, when storing all information for later preparation may be challenging. Variety refers to the ability to manage a wide variety of sources, as well as different information layouts and large numbers of sources. A major portion of the work on

massive data has focused on volume and speed; nevertheless, concerns of diversity are as important in dealing with a range of real-world problems.

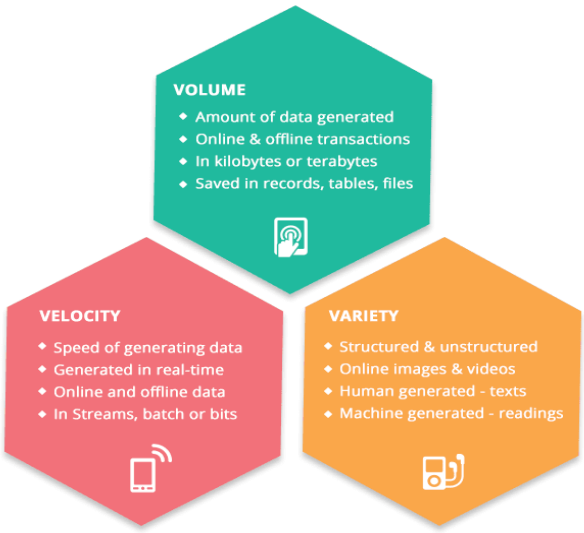

Fig. 1: Illustrates the 3Vs of Big Data[1].

Data integration is complicated by the diversity associated with large amounts of data. Huge amounts of data come from a number of sources, including social media streams, employee-created records, email systems, and business apps. Combining all of that data and organizing it so that it can be used to create reports may be very difficult. Although vendors provide a variety of ETL and data integration solutions to make the process easier, many businesses claim they have not yet addressed the data integration problem. Fig. 2 depicts a general data integration process.

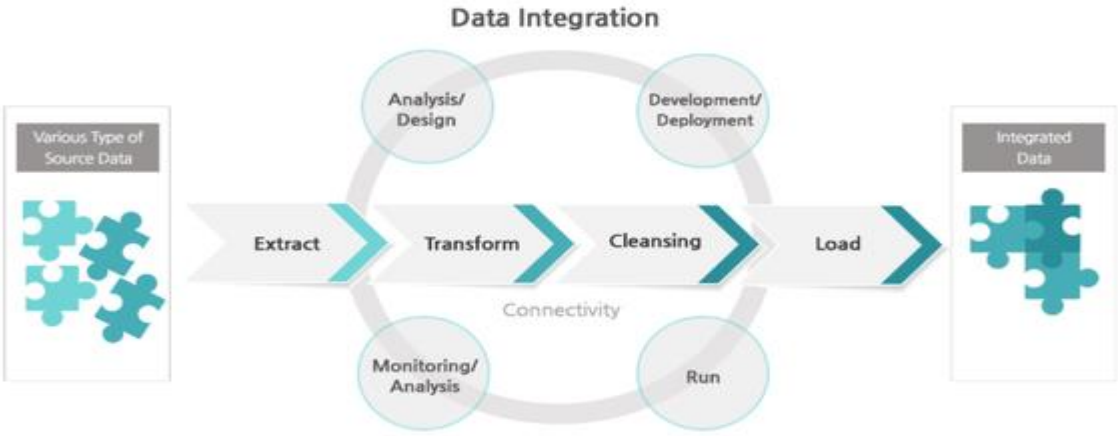

Fig. 2: Illustrates a general Data Integration Process[2].

Data integration is the process of enabling users to access, distribute, and utilise data across whole companies while maintaining its integrity and quality. It also allows changes to information stored in one source to be mirrored in many sources in real time. Big Data may be collected from a variety of sources, including spreadsheets, online services, relational databases, and more, and it can be in a variety of formats, including logical and hierarchical data.

Data integration allows big data to be realized. Data integration enables businesses to gather and clean large amounts of data originating from various frameworks for analysis by allowing access to information stored in various information stockrooms, mapping changes from one endeavor application to the next, and delivering real-time data to prospective clients.

Aside from big data analysis, data joining enables a variety of business advantages, including a 360-degree view of datasets, faster coordinated effort across entire organizations, and greater adaptability in selecting project applications and frameworks, as well as streamlining and automating business functions.

43. LITERATURE REVIEW

D'Aquin and Noy examined the features, content, volume, search techniques, potential application exploitation, and technological infrastructures of eleven ontology libraries [3].

A great deal of research has been done in the subject of ontologies. As part of their research, Noy and Hafner looked at a framework for comparing ontologies [4]. In order to determine the necessity for reusability, they looked at aspects such as design process, taxonomy, concept structure, axioms, inference techniques, applications, and contributions across a number of ontologies.

Ahmed et al. want to focus on the outcomes of integrating Big Data and Semantic Web, how Semantic Web makes Big Data smarter, the difficulties and potential of Big Data and Semantic Web, and the relationship between them, before ending with the integration's future route [5]. In recent years, large and complex amounts of data have been created, making traditional data processing systems difficult to handle. With the emergence of the Internet, the volume of information generated and made available skyrocketed. The World Wide Online Consortium W3C, an international web standards organization, popularized the Semantic Web. It's a more advanced version of the existing web that enables finding, reusing, combining, and disseminating information more easier.

Pasquier utilized a test example of biological data integration to show that when Semantic Web Technologies mature, they may be leveraged to build large applications [6]. Semantics has played a key part in Big Data integration. For example, Knoblock and Szekely translated a variety of data sources (represented in XML, KML, JSON structured text files, or databases) into a shared domain ontology that allowed for data integration, reasoning, and processing [7].

Flouris et al. addressed the need for a uniform nomenclature in the ontology community. They studied ontology change and came up with a consistent nomenclature [8].

Brank et al. looked at current ontology assessment methods, dividing them into layers such as lexical, syntactic, and structural [9].

44. DISCUSSION

44.1. Challenges of Integrating Big Data:

Big Data is a broad phrase that refers to large, complicated data volumes for which traditional data planning tools are insufficient. The integration of this massive informative index is very complex. Information creation, analysis, capture, search, sharing, representation, data storage, and privacy are some of the issues that may arise throughout this reconciliation.

44.1.1. Data Management:

One of the most essential aspects of integrating big data is data management. Data management becomes challenging when there is a large amount of data. NoSQL databases may be utilized to circumvent these issues. These databases are modern alternatives to conventional relational databases, and they provide excellent performance for a variety of large data applications. These databases are based on the key-value pair idea, allowing them to cope with large amounts of data in a short period of time.

44.1.2. Bad Data:

Data quality is the most important concern in any data integration solution. Organizations must clean up inheritance data prior to the change and joining, or they will almost certainly face honest-to-goodness data issues later. Legacy information pollutions exacerbate the problem since they are designed to target high-volume information customers. If this data is degenerate, it will make decisions along these lines as well. During the time spent cleaning data for usage by the integrated framework, it's not uncommon for new information quality problems to arise.

44.1.3. Lack of Skills:

Customers are migrating from conventional relational databases to new information processing systems such as NoSQL databases, in-memory analytics, and Hadoop as a result of the introduction of new technologies in the market. In fact, there is a scarcity of necessary talents for big data breakthroughs on the market. In the marketplaces, there are an average number of masters accessible to work on these systems that handle massive amounts of data.

44.1.4. Transmission of Data into Big Data Structure:

Various individuals have shown an interest in separating massive data accumulations for a notable data platform. They may also overlook the adaptability of data and information entry, transfer, and movement from a wide range of sources, as well as the subsequent stacking of this data in a large data stage. The wonderful aspects of data transfer, such as getting there and stacking, are only pieces of the exam.

44.1.5. Extracting Information:

The most practical use cases for big data include data availability, increasing current data accumulating, and also enabling access to end-clients via business knowledge instruments with the actual goal of data disclosure. It becomes a test in massive data coordination to assure data availability to data clients at the correct moment.

44.1.6. Synchronization Data Sources:

When data is imported into large data stages, we should be aware that information copied from a variety of sources at various rates and schedules might quickly deviate from the beginning structure. This ensures that data gathered from one source does not become outdated when compared to data gathered from another source. It also deduces the interdependence of data definitions, ideas, and metadata. The typical data administration and data circulation emphasis, as well as the collecting of data change, extraction, and motions, all contribute to the risk of data being unsynchronized.

44.1.7. Other Challenges:

Other challenges that may arise during data integration include the large volume of data, the cost of arrangement, the dependability of information, and the pace of change of data. Actually, it's more of a test to practice handling a large volume of data with practical speed, with the essential goal of getting the info to the right client at the right time. The approval of data collection is also completed when trading data from one source to the next or to buyers.

44.2. Semantic Web:

Today's data frameworks must identify the heterogeneity of information stored in many self-ruling information sources. The use of the World Wide Web as an all-encompassing platform for exchanging data, in particular, has profoundly altered our perceptions of information access and control. We believe that the unambiguous introduction of information semantics will stimulate information interoperation in a range of information control activities, based on the semantic web's perspective.

The semantic web aims to provide machine-understandable information on the internet. It's made up of two standout components: web ontologies and data annotation. Despite the fact that the development of an ontology, inference engine, and various segments is required for the recognition of the semantic web, the rule of the semantic web advises us that information semantics is to set up and maintain the correspondence from information to the subject is planned.

44.2.1. Semantic Data Integration:

Semantic information integration, on the other hand, is a method of combining data from disparate sources and integrating it into essential and meaningful data through the use of semantic technology. As a business grows in size, so does its data. Intradepartmental or application-specific information storehouses quickly arise without the proper information management system, obstructing efficiency and participation.

Semantic Data Integration is a solution that goes beyond traditional enterprise application integration solutions. It makes use of information-driven engineering, which is based on a well-established paradigm for information distribution and sharing, the Resource Description Framework (RDF). This system communicates, stores, and distributes heterogeneous information from an organization, such as structured, semi-structured, and unstructured data. Because the information structure is transmitted through links within the material, it is not bound by the database's structure and does not go out of date as the content evolves. The following are some crucial phases in the semantic data integration process.

i. Creating an Application Profile (RDF Shape) that reflects the last dataset's desired kind.

ii. Repurposing current ontologies and creating new ones when needed.

iii. Making full use of the available Linked Open Datasets in the area.

iv. Creating a simple, reasonable, and useful URL approach.

v. Performing the integration using a variety of transformation and ETL technologies that are available.

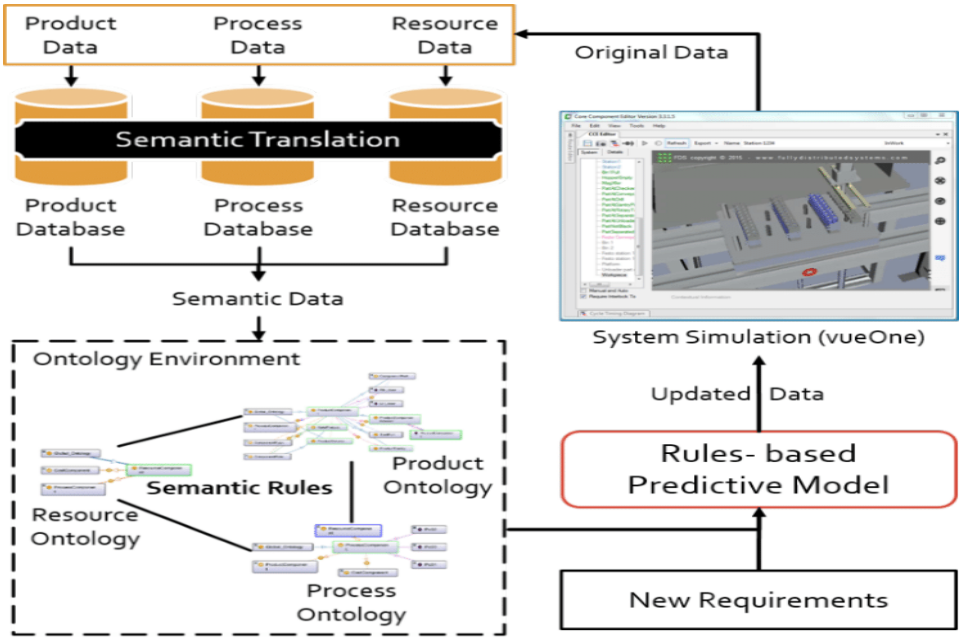

Fig. 3: Illustrates Ontology-based Semantic Data Integration Framework[10]**.**

Organizations require a set of easy-to-use semantic integration devices to go through the entire semantic information integration lifecycle. Clients may quickly design information handling activities and integrate a massive volume of data using semantic integration tools. Fig. 3illustrates ontology-based semantic data integration framework.

There are two main tasks involved in data integration. The first is homogenizing contrasts in diagrams and classifications used to communicate information at the schema level. The second method, information-level integration, entails identifying data in multiple informational collections that allude to a same certifiable material. Several writers investigate the topic of structural and semantic heterogeneity in the big data integration process. To tackle various research difficulties in the integration process, they suggested a large data semantic model based on ontology, which they developed by integrating semantic web technologies and creating ontologies amongst semantic models to solve the problem of incomprehensible data. They built a Key/Value storage model based on ontology to tackle the challenge of heterogeneous data storage. In a case study, Knoblock et al. developed a novel system named Karma that tries to tackle the variety problem by utilizing semantic technology to combine many types of Big Data sources[11].

Starting with the importation of various types of data sources, cleaning, modeling, and its issues, and ending with the integration process, a thorough description of the many processes has been provided. To overcome integration problems, the suggested system employs semantic RDF technology. For example, at the schema level, recognizing the same things in various datasets. Only certain types of structural and semi-structural data sources are validated by the system. According to Torres et al., emotional and sentimental analysis of social networks in the financial domain using a combination of social networks (Twitter), semantic financial ontologies (FIBO), and other assets that provide uniform vocabulary to express emotions and sentiments in a proper format[12]. Different data from Twitter, such as emotions, views, and actions, combined with FIBO and other data assets give a deeper knowledge of various groups, which might be useful in the financial arena. The job is completed in a legal and orderly manner, and the suggested framework is thoroughly explained. There is no evaluation or approval of the recommended techniques, and the conclusion is broad and does not clearly reflect the benefits of the proposed strategy. Consider a patient in the medical profession who requires a tailored health-care service design. To meet this need, a medical services framework must establish a new basis that allows for the direct distribution of patient information under the supervision of an expert. On the other hand, the condition would allow health-care delivery systems to make better judgments regarding their patients based on information from all of them. The study presents and investigates a Big Data and Semantic Web-based approach to Personalized Medicine. As part of smart data, Big Data can access and process a large quantity of homogenous and heterogeneous information on each individual patient. Because information is frequently unorganized, Semantic Web Technologies become maybe the most significant component and are used to explain various concepts.

45. CONCLUSION

Big Data nowadays is extremely varied, originating from a variety of sources that include organized, semi-structured, and unstructured data. Many companies want to combine this disparate data in order to conduct critical operational and analytical tasks on it. However, it is important to keep in mind that this integration may confront several hurdles during the process. This review article examines some of these difficulties and the role of the semantic web in addressing them through semantic data integration. This paper's future work will provide a new paradigm for integrating heterogeneous huge data sets utilizing semantic web technologies.

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HYDROGEN PRODUCTION VIA ELECTROLYSIS: AN OVERVIEW

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ABSTRACT

Water electrolysis is a relatively new technique for hydrogen generation, having been developed about two centuries ago. This paper examined the incident, situation, and importance, as well as the history, present, and future of different water electrolysis methods. Thermodynamics, energy requirements, and efficiency of electrolysis processes are discussed in this paper. The effects of alkaline water electrolysis, polymer electrolysis membranes, and high temperature electrolysis are discussed and contrasted. Water electrolysis has a limited proportion of the hydrogen generation market because to its high cost, extensive maintenance, poor durability and stability, and low efficiency when compared to other existing technologies. Current water electrolysis technology and expertise are examined and evaluated to see where changes and development are needed for hydrogen generation. The energy requirements, practical cell voltage, process efficiency, temperature and pressure effects on potential kinetics of hydrogen production, and the effect of electrode materials on traditional water electrolysis for Alkaline electrolysis, PEM electrolysis, and heat electrolysis are all examined in this review paper.

KEYWORDS:*Electrolyte, Electrode, Electro Catalyst, Hydrogen Production, PEM, Water Electrolysis.*

INTRODUCTION

Many greenhouse gases, such as SOx, NOx, CO2, and CO2, are released into the atmosphere as a result of hydrogen generation by hydrocarbon fuel sources, which may have severe consequences for the environment. As a result, clean technology is needed for hydrogen generation, which will be accomplished if hydrogen is generated from renewable sources such as water electrolysis, with no emissions of SOx, NOx, CO2, or CO, as well as the realization of a "hydrogen economy." In reality, several significant non-fossil fuel based technologies such as water electrolysis, photo catalysis, and thermochemical cycles are used to produce hydrogen. Solar and wind energy are also viable options for producing hydrogen via water electrolysis, which is a low-cost, high-purity, and environmentally friendly technique[1].

Concerning environmental effects of various hydrogen generation methods, no clear conclusion on the optimal technique can be made based on these single score findings. Such comparisons

are only possible if the weighting factors and single score computation assumptions are same. For all of the technologies under study, techniques are used. Aside from that, comparing specific effect categories (e.g., Individual environmental emissions (as defined by CML) or Compared to comparing single score values, this method is more accurate[2].

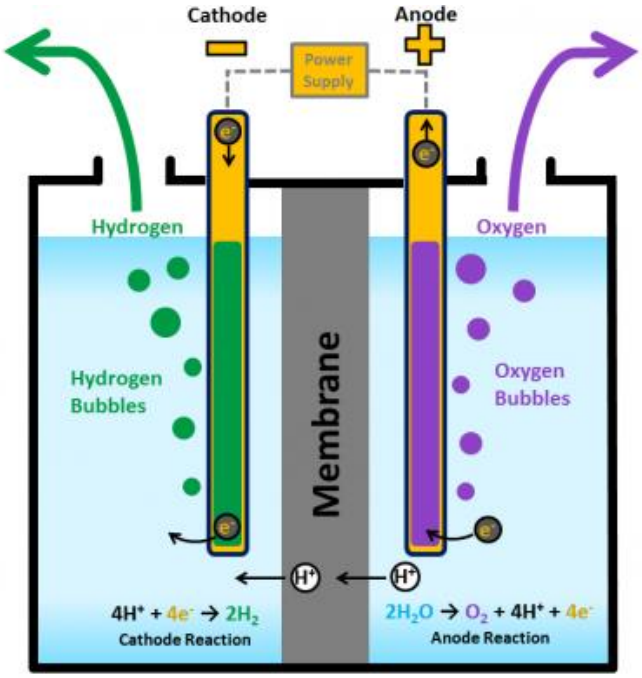

Figure 1: Illustrate the diagram showing the water Electrolysis

A DC electrical force producer is connected to two anodes, or plates, which are submerged in water and made of an inert metal, such as platinum or iridium. At the cathode (where electrons enter the water), hydrogen will appear, whereas oxygen will appear at the anode. If faradaic productivity is perfect, the amount of hydrogen produced is twice that of oxygen, and both are proportional to the total electrical charge directed by the solution. However, competing side reactions occur in many cells, resulting in a variety of items and less-than-ideal faradaic efficacy.

Electrolysis of pure water requires a large amount of energy as well as a high potential to overcome various starting barriers. Without an excess of energy, electrolysis of pure water takes place slowly or not at all[3]. This is due in part to the fact that water's self-ionization is limited. The electrical conductivity of pure water is about one-millionth that of saltwater. Many electrolytic cells may also be lacking in the necessary electro catalysts. The expansion of an electrolyte (for example, a salt, a corrosive, or a base) and the use of electro catalysts increase the productivity of electrolysis.

Because hydrogen can now be supplied more affordably from petroleum products, the electrolytic cycle is now sometimes used in mechanical applications. Water electrolysis offers a number of advantages for hydrogen generation, including being a pollution-free method if renewable energy sources have a high degree of purity, being a relatively simple process, and having a large number of resources. Water electrolysis is a nearly 200-year-old technique, with J. W. Ritter in Germany demonstrating the concept in an experiment about 1800 AD. William Nicholson and Anthony Carlise decompose water into hydrogen and oxygen in England the same year. After tens of years, this technology's use began[4]. In 1890 AD, the French military built a water electrolysis machine to produce hydrogen for Charles Reynard's airships. Around 1900 AD, there were about 400 industrial electrolyzes in operation all over the globe. Different types of alkaline electrolyze were created about 1930 AD. The introduction of PEM electrolyzes in the 1970s AD provided many benefits over alkaline electrolyzes, which were restricted to modest

hydrogen and oxygen generation capabilities due to costly materials and a short lifespan. Water electrolysis technology progressed slowly because steam reforming could generate hydrogen at a cheaper cost.

In all, approximately 500 billion Nm3/year of hydrogen is produced throughout the globe, mainly via steam reforming. Hydrogen generation through water electrolysis is currently too inefficient to be commercially viable. Water electrolysis has significant difficulties with poor gas evolution rates and excessive energy usage. For typical industrial electrolysis, an average amount of energy is required. The efficiency of water electrolysis for hydrogen generation processes is a critical metric. Many academics have examined the energy consumption and efficiency of hydrogen generating systems as part of their study[5]. The authors defined energy, energy analysis, energy efficiencies, various driving energy inputs, definition of efficiency, thermodynamic analysis, thermodynamic electrochemical features, thermodynamic losses, system boundaries, and warmth fluxes in various electrolyze plants. The energy requirement, practical cell voltage, process efficiency, temperature effects on potential, bubble mechanics and effects, kinetics of hydrogen production, and effect of electrode materials on traditional water electrolysis for Alkaline electrolysis, PEM water electrolysis, and heat electrolysis are all investigated in this review paper.

Alkaline water electrolysis is the most straightforward and straightforward technique for producing hydrogen. One of the major drawbacks to broad adoption of this method is its inefficiency. Efforts in development and research are required to overcome drawbacks such as energy consumption, maintenance costs, durability, dependability, and safety. The thermodynamic analysis depicts the theoretical and real energy needs, system resistances, and various efficiencies; these characteristics will aid in identifying the main issues that need to be addressed. The kinetic study shows the rate of reaction in alkaline solution, the surface activity of the ion transfer electrode, and the impact of different electrolytes and additions on production[6]. In order to improve this application, researchers must think about ways to reduce electrochemical reaction resistance, low-cost electrodes, electro catalysts, electrolytes and their additives to improve ionic mass transfer, corrosive resistive electrolytes and electrodes for electrode durability to reduce electrode physical phenomena, and electrode suction. Improve HER and OER catalytic activity by utilizing advanced binary, ternary, or quaternary alloys, increasing electrochemical active surface area, catalyst utilization, and corrosion resistance, and developing highly conductive supporting catalyst. Improve proton transport through the catalytic layer and water transport over the triple-phase boundary by understanding and improving the triple-phase boundary[7].

Finding catalyst alternatives to substitute limited iridium or unstable ruthenium for the anode will be regarded as a major accomplishment. New catalyst designs or tailored structures may be able to offer the required conditions for reducing iridium levels or stabilizing ruthenium dissolution over time. Improve catalyst stability, look at other supports other than carbon, and look into metal-free N-CNTs catalysts for the cathode. Exploring the utilization of high surface area carbon materials with modified pore size, functional groups, grafted polymers, and electrical conductivities to achieve greater activity and stability is also essential. To provide new support materials, catalysts, and electrode systems, use novel production techniques.

Although hydrogen is usually regarded as a clean fuel when used (direct combustion or use in fuel cells), its manufacture has severe environmental consequences. A comprehensive picture of the environmental costs associated with hydrogen generation may be obtained by looking at resource consumptions, energy needs, and emissions from a life cycle perspective. Plant manufacture and installation (hardware), plant operation (energy required to run the plant as well as feedstock for hydrogen production), and storage and/or distribution of the generated hydrogen are the three stages of hydrogen production (use phase could also be included as the fourth

phase). The majority of the environmental effects involved with hydrogen generation, ranging from steam methane reforming through electrolysis, occur during the plant operating phase. It is owing to the use of natural gas as a feedstock in steam methane reforming, and it is due to the use of fossil fuel dominated grid power to run the electrolyze in electrolysis[8]. These effects may be reduced in the electrolysis process when hydrogen is generated using renewable energy power (a schematic process flow diagram for electrolysis based on renewable energy electricity is shown in Fig. 2). Direct emissions are virtually non-existent or minimal during the operation of such systems. The production and construction of renewable energy power plants, on the other hand, cause environmental harm. The life cycle assessment (LCA) method aids in the understanding of such effects at various stages of the production chain[9].

LCA is a well-established and widely recognized technique, as specified by ISO 14040 and ISO 14044 standards. The life cycle of a product refers to all actions that occur throughout its lifespan, from its production to its use and maintenance to its ultimate disposal, including the purchase of raw materials needed to produce the product. There are many impact assessment techniques in use for evaluating environmental impacts. CML 2001 and eco-indicator 95 are the most often utilized techniques in the research evaluated in this article. The European Union has created and approved a guideline for conducting life-cycle assessments of hydrogen generating systems. This technique also meets the requirements of ISO 14040 and 14044. Because this guideline was just recently established, its use in LCA analysis has yet to be documented in the literature. The goal of this study is to use LCA to examine the environmental impacts of various hydrogen generation methods utilizing existing literature in the area. An extensive literature search was conducted for this aim. The review focused on LCA-related publications and reports on hydrogen generation technology. A total of 17 peer-reviewed articles and 4 reports or pre-prints were chosen for a comprehensive examination. Articles from all around the globe were examined regionally. Articles and reports published between 2000 and 2012 were evaluated in terms of publication dates. A comprehensive study presents the most up-to-date information on the life-cycle assessment of existing hydrogen generation methods. Although the paper's primary emphasis is on electrolytic hydrogen generation methods, it also includes non-electrolytic alternatives for data/results comparison[10].

Electrolysis Is Used To Produce Hydrogen.

Hydrogen may be made from a number of different sources. These include fossil fuels like natural gas and coal, as well as renewable resources like biomass, which may be turned to hydrogen directly via gasification and reformation. Water is used as a feedstock in electrolytic technologies, with energy produced from renewable (solar, wind, hydropower, etc.) or non-renewable resources. Because of the variety of these resources, hydrogen is a potential future energy carrier. Chemical, biological, electrolytic, photolytic, and other processes/technologies may all be employed to make it. Each technology has its own set of advantages and disadvantages. Local feedstock availability, technological maturity, market applications and demand, regulatory problems, and prices all affect the selection of appropriate hydrogen production alternatives.

The electrolyze module is made up of cells that are linked in parallel or series. The electrolysis-generated hydrogen and oxygen are cooled, filtered, compressed, and stored. The oxygen is not kept at many installations; instead, it is released to the environment. There are other electrolyzes that generate hydrogen at high pressure, eliminating the compression step and its accompanying expenses in terms of both money and energy. The water that enters the unit is cleaned beforehand to prevent mineral buildup and unwanted electrochemical reactions in the cells. Electrolyzes, in general, do not need ongoing maintenance since they have few moving components. They are quiet and modular, making them ideal for dispersed applications in residential, commercial, and industrial environments. Despite the fact that electrolyzes have been

in use for decades, there is still room for improvement in many areas, such as manufacturing, distribution, and installation costs; electrolyze module, power supply, control system, and other efficiency improvements; operation under variable electricity supply profiles; increase of operating temperature and pressure, and so on. Alkaline, polymer electrolyte membrane, and high temperature solid oxide electrolyzes are the three kinds of electrolyzes accessible. In the following sub-sections, they are briefly discussed.

Environmental Performance Of Electrolysis

Throughout this system process, fossil fuels, metals, and minerals are utilized as significant inputs. Iron contributes for 37.4 percent of the resources utilized, and is mostly employed in the manufacture of wind turbines and hydrogen storage tanks. For the concrete foundations of the turbines, a significant quantity of limestone is required, accounting for 35.5 percent of the main resources. Coal contributes for 20.8 percent of all resources utilized, mainly for the production of steel, iron, and concrete.

The best technique is wind-based electrolysis, followed by hydro. Although these figures for hydro were given in three literatures, none of them specified the process chain or the system boundary. As a result, based on the examined literatures, it is impossible to explain why hydro performed worse than wind. Emissions from major civil works during the hydropower plant building period may be one of the causes (deforestation for dam, channel, powerhouse, etc. construction). Emissions may also be caused by long-term biomass breakdown in big water dams. Solar PV, solar thermal, and biomass-based electrolytic methods have somewhat higher GWPs than hydro or wind electrolysis. Higher PV values are attributed to emissions associated with the module manufacturing process. Despite the fact that the biomass-gasification-electrolysis method has a lengthy process chain, the GWP is very low, just slightly higher than solar thermal.

DISCUSSION

It is necessary to develop membrane alternatives to Nation using improved membrane manufacturing techniques, leading in electrolytes with better proton transport but reduced gas crossover and greater durability. This may be accomplished via the use of membrane composites or blends, the addition of inorganic or organic fillers, or the introduction of molecular barriers to the electrolyte. Much of the varied jargon that has been used from the beginning to now has been collected and documented from one place through this examination. Finally, we presented our vision for future study in order to obtain PEM electrolyzes as a dependable, cost-effective option to assist in the resolution of renewable energy problems. Pressurized electrolysis requires lower work and total (work and heat) energy inputs on a continuous basis. Furthermore, for pressurized electrolysis, the proportion of labor composing total energy is higher, implying that the possibilities of integrating an electrolysis system with external heat sources must include both operating temperature and product pressurization.

CONCLUSION

The performance of high-temperature alkaline electrolysis cells is compared at different current densities, a broad range of pressure and temperature, and with various anode and cathode materials, and it shows a significant improvement. Although the findings are promising, further research is needed to fully understand the reasons for the observed significant reduction in terminal potential, as well as the probable impacts of product mixing and/or electrode degradation. The use of superheated steam to replace the water in the cell, as well as other modifications needed for long-term cell characterization. In conclusion, this study may serve as a foundation for the creation of a new generation of alkaline electrolysis systems that operate at very high temperatures and pressures. HT steam electrolysis may be a possibility in the future,

but only in the long term, due to the high efficiency of water breakdown at higher temperatures. This technique would be ideal for centralized and large-scale hydrogen production facilities since it requires HT heat and base-load operation. At the moment, research and development efforts are primarily focused on the creation of long-lasting materials that will increase the lifespan and performance of electrolysis stacks. Reduced system complexity is also a significant issue.

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THE RING AND ITS ARTISTIC INTERPRETATION IN UZBEK FOLK MAGIC TALES

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ABSTRACT

In the epic works plot, the ring plays an important role in connecting the ideas expressed in the events development. In the events depiction, it is observed that the ring is interpreted in a single or in several artistic tasks at once. The article deals with the artistic functions of the ring in Uzbek folk tales, the mythopoetic interpretation of the ring in the examples of folklore.

KEYWORDS:*Ring, Uzbek Folklore, Folklore, Fairy Tales, Epics.*

INTRODUCTION

The ring is one of the riddles often used in fairy tales and one of the details that has acquired a traditional meaning in the epic text.He often appears in fairy tales, legends and epics as a wonderful assistant to the epic hero in overcoming a hostile force or achieving a noble goal. Throughout the play, when the protagonist is faced with new, more difficult problems, the ring helps him overcome these weights. It collaborates and helps the hero. A ring is a simple piece of jewelry, but priceless.In fairy tales, its pricelessness is further exaggerated.

The first samples of rings were made from the animals skin and bones and were considered totems, and later from various metals (bronze, copper, silver, gold, brass).

Usually the rings were with or without eyes. The rings with eyes called “niginshininand”, “niginchnok”, “nigindor” [1]. The rings without eyes are “nigin”. Also, the names of the rings with and without eyes are different in other nations. In particular, Russians call a ring with an eye a "ring", and without eyes - a "circlet".

The “eye” of the rings is often made from stones such as turquoise, ruby, and sapphire. They are made to resemble the eyes of animals such as oxen, camels, or birds such as crows and nightingales [2]. It was believed that the eye of the ring protects the ring owner from the evil eye, kinna, envy.

Legend said that the first person to wear the ring was Jamshid. After that, it was habitual for all men and women to wear rings. The ring is valued as one of the priceless cultural artifacts created by the intellect, craftsmanship, and handwork of mankind. That is why it has become so firmly established in our way of life. By them it was even possible to determine the social and material status of people. While women from a wealthy family often wore silver, gold and ruby rings in

their hands, poor, helpless women wore only one or two brass, copper rings. That is why fairy tales show in a unique way that having a ring is not for everyone and is not easy.

Fairy-tale characters are usually told to reach the ring in five different ways:

а) presents the ring to the hero for any good and noble help made by his owner, the generous magician;

б) The hero fights or bets on an evil force (giant, dragon, witch), defeats him and pulls the ring;

в) Because the heroine has won the love of the fairy, the fairy girl presents him with a ring on her hand as a symbol of love;

г) The protagonist steals a ring from the space of mythological characters;

д) The protagonist finds the ring inside the inherited mysterious box.

In the fairy tale, the magic ring is used for good, creativity when it falls into the hands of good, open-hearted, pure-minded, hard-working, brave and generous people, and used for evil in the hands of selfish, ruthless, evil, greedy and covetous people. That is why the well-meaning fairy-tale hero tries to keep his ring like the apple of his eye, not to reveal the magic associated with it to anyone.

In the epic works plot, the ring plays an important role in the events development, connecting the narrated idea. In the events depiction, it is observed that the ring is interpreted in a single task or in several artistic tasks at once. In Uzbek folk magic tales, the artistic functions of the ring can be grouped as follows:

1) A means of bestowing happiness on the epic hero;

2) Change, i.e., a means of transforming a fairy-tale protagonist from one form to another;

3) A means of transporting from one place to another, i.e., a long-distance approaching vehicle;

4) A magical object that informs, warns, or has the power to reflect distant events;

5) Generous material supplier;

6) A companion and miraculous helper to those who set out on a journey in search of happiness;

7) Creative, builder and creator;

8) Means of enchanting and liberating from magic;

9) A deadly magic weapon.

In Uzbek folk tale "Oypari" it was interpreted some of these artistic functions, typical of the "magic ring". [3]. Therefore, the "magic ring" played an important role in the fairy tales development.

According to the tale, the protagonist inherits the magic ring from his father. This ring is also inherited from his father. He was left to his father by his grandfather, who said, "Use it when you have a hard time." Therefore, because of his father’s poverty, the rich man discouraged him from returning his suitor and advised his son (the protagonist) Orzimbek to use the inherited ring in order to support his oppressed son. The ring comes out of the ninth drawer in a box buried under an old walnut tree in the courtyard. In the details of where the ring was found and kept, there is a hint of its secret.

Orzimbek looked at the ring and saw a gold ring with a ruby eye. It was wtitten “Put this ring on the middle finger of right hand, say 3 times your desire and say will it will”. These words, written on the eye of the ring, add mystery to it. Thus, a magic ring appears in the fairy tale plot, which stimulates the subsequent events development.

The fact that there is a mysterious inscription on the ring and that it is inherited was not accidentally included in the tale plot. This is a unique household item in a fairy tale.

It is known that both in the past and today, parents tries to pass this or that on to his children, thereby laying the material foundation for their future and in doing so they often seek to inherit gold items, housing, arable land, and so on. It is at this point that fairy tales hint at the same social reality. Indeed, children with an inheritance are able to balance themselves financially quickly and easily in marriage. Therefore, the issue of "heritage" is interpreted separately in folk tales. However, it is also emphasized that only children who have more or less effectively used the inheritance left by their parents can achieve true prosperity and happiness. Inheritance reflects the parents' hard work, their love and care for their children, their concern for their future. In fairy tales, a child has a different attitude to inheritance, someone uses his inheritance wisely and wisely, multiplies it, and someone, on the contrary, squanders the inheritance left by his parents without calculation or planning. In the fairy tale "Oypari" the hero's intelligence is glorified in this respect. The "magic ring" demonstrates the inheritance power from parents.

Orzimbek also inherited a gold ring with ruby eyes. The price of such rings has always been high in the market. When financial hardship befalls him, if it is sold, one is much more relieved of financial hardship. So, these kinds of rings, which are small but have a great price, can be a real material inheritance for children. But such an inheritance can only be sold when there is a very severe financial hardship on the head, as used in the tale. At other times, it should be honored as a souvenir from the parents. This, in turn, is tantamount to honoring the memory of the parents. In folk tales, this idea is interpreted in an artistic way as above. The interpretations associated with the written ring inheritance in a fairy tale have a certain vital ground. According to reports, in the past, the ring served as a personal seal for people. According to sources, until XVIII-XIX centuries emir, khan, kaziy, kushbegi (title of first minister at the khan's court), biy (head of a tribe or union of tribes), volost ruler; persons holding public office, such as the centurion (official, higher than ellikbashi), and religious figures such as ishan, mufti, sheikh, had their own ring-shaped seals and such ring-seals are usually worn on the pinch (little finger) of the hand.

They were engraved with the name of the ring owner, his position, and excerpts from Qur'an verses. Some professionals also had their own symbolic rings [2.– p.159]. For example, dead washers, shaman- healers and etc.

The fact that government officials had seal rings also confirmed by the story "Amir Temur's Turquoise Ring"[4]. "Written ring" is also found in the plot of the epic "Ravshan", which belongs to the series "Gurogli". Ravshan found out about his future wife Zulkhumor from the inscription on the ring eye that his grandmother Yunus gave him. There is a name of Zulkhumor name written on it. After that, Ravshan sets out in search of Zulkhumor.

In general, the motive roots that the ring has a mysterious inscription and that this inscription serves as a guide to the epic protagonist are genetically related to the life reality and are expressed in the works epic plot as artistic re-perception of real vocabulary.

In the fairy tale "Oypari", Orzimbek, who has a ring, at his father urging, puts the ring next to him and goes on a journey in happiness search. At this point, we can see the artistic role of the "Magic ring" as a companion to the protagonist.

On his way, Orzimbek encounters a young man who has been magically turned into a snake and saves the young man from witchcraft by helping him with his ring. The young man returns to the human form again from the appearance of a snake with the help of a ring. Throughout the tale, Orzimbek uses this power of the ring several times. With the help of the ring, the hero turns into the wind. He transforms the wicked from the appearance of a man to the appearance of a donkey,

a mule, a dog. So, the magic ring is interpreted in the fairy tale as an evocative, enchanting and magical deliverer.

The secret of the magic ring is that, first, it reads a sentence like a human, can speak, does the task with a vengeance, gives advice to the protagonist and guides him. It is no coincidence that the ring is revived in such a way in fairy tales. In ancient times, Arab and Iranian jewelers made rings that made a sound when the hand moved. They believed that their voices drive away evil spirits, death. [2.– p.160-161.]. The beliefs that emerged about sound rings were undoubtedly the basis for the creation of the magic ring image that spoke aloud in fairy tales. Another unusual feature of the magic ring in fairy tales is that it can do things that cannot be done with human power. In order to accomplish such strange deeds, it is necessary to repeat the intention three times. After that, the ring starts working. This exaggerates its inherent mystery. In magical tales, the ring is interpreted not only as an evolutionary, but also as a "magic mirror" that reflects and informs the distant person. In particular, in the fairy tale "Oypari" its role is observed. Orzimbek remembers the ring and repeats it three times, asking to be shown so that we now know where Oypari is. He looked at the ring and saw that Oypari was sitting sadly somewhere in the house.

Apparently, in a fairy tale, a magic ring can, at the protagonist request, inform about the person who is far away from him, his behavior, and his mental state. This emphasizes its truly strange and magical nature.

In fairy tales, another artistic function of the ring is that it delivers the protagonist from one place to another without a horse, in the blink of an eye.

Thus, the *magic ring* is also a tool that brings a long distance closer in fantasy tales. In this respect it deals with mysterious objects such as flying carpets, flying boots, flying wineskin, flying brooms.

The magic ring also provides the protagonist and his companion with magical costumes and mysterious weapons as a generous material supplier in the fairy tale “Oypari”. He does this in a second: when he closes and opens his eyes, in front of him was a sword and shield, and on his saddle hung a garment that did not burn, did not sink in water, and was fireproof. Then the ring looked at them and said: “Do not be afraid, put on these clothes, ride the horses, and go on your way. If you encounter giants, dragons, wild beasts, or creatures on your way, use your sword, if you take it out of the vagina, it stretches forty arshin”[3. 77-105 pp]. In general, these same things, which are created with the help of the magic ring power, are also distinguished by their mystery, power.

There are fairy tales in many nations where a magic ring is found in the plot.In them, the magic ring is interpreted almost the same. For example, in Rumo's fairy tale "The Magic Ring", the boy gets a ring for his help to the old woman. The old woman told him to use the ring only when he is tired of something.To use it, it is worn on the finger and applied, or the ring on the finger is twisted back and forth.Then the ring begins to perform the assigned task. Only the hero should not lose the ring. If he loses, disaster will fall on him. In the fairy tale, the young man achieves a table full of various treats equal to the open table with the ring power.He builds a very beautiful tower.

In the Russian folk tale "Dead Princess", the princess dies when she wears a ring given to her by an old woman.This highlights the artistic function of the ring as a deadly, magical weapon.

In the Uzbek folk tales “Flower ring”, “Base ring” a young man rescues the son of the king of snakes. He then advises the young man to ask his father, who is the king of snakes, for the ring on his hand.This ring will symbolize the snakes dominion. It is known in life that the ring was used as a state symbol, a state seal. So, in the fairy tale, this vital reality is used in its own artistic

form.In this tale, the young man resurrects his dead mother using the magic ring of the snakes king.He builds a golden house for himself.

People have had a religious attitude towards the ring since time immemorial. It is valued as a preservative amulet. It was believed that a person with a ring would not be harmed. These notions led to the ring image interpretation as a magical object in fairy tales. Certain beliefs were also followed in choosing a stone for its eye. What kind of metal the ring was made of - gold, silver or copper - had certain symbolic meanings.

From the language of the ring in the fairy tale "Oypari": "As long as I am with you, I will not harm you", - it is not in vain. These sentences describe the nation's fetishistic belief in the ring.

In the "Oypari" story there is another case.It is also the fact that the fairy tale protagonist carries the ring with him without wearing it.Only when the protagonist uses the ring does he take it from him, put it on his middle finger, and tell him his intention three times. Such a fairy tale interpretation was not in vain. Because, in ancient times it was forbidden to wear a ring [5].

The ring also served as an amulet against evil spirits. Therefore, in fairy tales, it is shown to be a miraculous helper to the hero in overcoming evil forces, fighting them and winning.

The ancient magical-mythological, fetishistic views that the ring could fight evil spirits or hinder the death path were the basis for its further socio-magical function exaggeration. After that, instead of wearing the ring, the idea of wearing it regularly became more and more popular. Even at a certain period, women wearing rings were especially compulsory. That is why the girls were presented with a wedding ring by the groom on their wedding day.

Nowadays, men and women wear the ring equally. However, women's rings are distinguished from men's rings by their elegance, often by the fact that they have an eye selected from colored stones.

According to Lapland tradition, when a person dies, the person who puts him in the grave takes a copper ring from the deceased's husband, wife or child and puts it on his right hand [5– C.235]. (Probably because of this, in fairy tales, the focus is on which hand the protagonist wears the magic ring). It was as if this ring was acting as a tumor that protected him from various evil deceased soul influences. It is noteworthy that even among our people it is known that dead washers, that is, those who are engaged in the ghassal profession, wear a silver ring on the right, middle finger. So the ring also served to define the people profession.

The socio-magical function of the ring can be further substantiated by some traditions example and ceremonial elements that exist among the people.

The ring also served as a target for rifleman in ancient times.[6] To do this, the ring is worn on the index finger of the left hand. When shooting a bow, the arrow tip was placed on this ring and the target was taken. Even in competitions to determine the best riflemen, the condition is to pass the bow axis through the ring eye.

Ancient rings depict this or that goddess. For example, a gold seal ring made in Bactria at the end of the IV century and the beginning of the III century BC depicts the goddess of water and fertility Anahita [2. 191 p.]. In this way, Anahita was supposed to sponsor the ring owner and protect him.

The magic ring image is also found in works created in the written literature. This example is AlisherNavoi's epic "Farkhod and Shirin". The magic ring interpretation in this epic is based on popular opinion about it. This shows how popular the public opinion about the magic ring is. At the end of Rumo's fairy tale "Magic ring," the young man occasionally uses the ring, thinking, "it is not fair that everyone should work hard for what they want." In fact, these thoughts, which are emphasized as the young man thoughts, embody the noble people view.

Thus, the "magic ring" idea is based on the magical, fetishistic ideas of the ancients, and is interpreted in folk art fairy tales in a unique artistic way. Through it, people's dreams of a good and prosperous life, a peaceful and prosperous life are artistically expressed.

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INFLUENCE OF NUMBER OF SEEDLINGS AND AMOUNT OF FERTILIZERS ON THE DEVELOPMENT OF ROOT SYSTEM OF WINTER WHEAT

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ABSTRACT

In this article, the biological characteristics of winter wheat, the conditions under which it grows and develops, the options for the amount of fertilizers, tubers, flowering, ripening varieties, the effect of ambient temperature, soil moisture and its structure on the height of normal growth.

KEYWORDS: *Autumn Wheat, Straw, Threshing, Flowering, Grain, Seedlings, Straw.*

INTRODUCTION

Agricultural crops, including wheat root, need to grow, develop, and absorb nutrients in order to make effective use of fertilizers.

In this section we need to determine what changes occur in the growth, development and absorption characteristics of the root system of winter wheat variety "Polovchanka", the number of seedlings when creating a different number of seedlings was.

First of all, the roots of plants are selective, not the main base in their lives, they absorb dissolved substances in the soil with water under different conditions.

It depends on many factors, such as ambient temperature, soil moisture and its structure, air regime, the amount of nutrients in it, the number of seedlings, the level of light. Changes in any root process depend on all the characteristics of the plant on the surface.

Typically, 60-80% of the winter wheat accumulation phase is completed before the cold snap in the fall. a nodular tumor is formed, which is called a nodule. Lack of moisture in the soil layer for the accumulation joint reduces or stops the formation of most stems. In field conditions, 5-7-10 or more stems per plant. Stems can also be formed from dormant buds and coleoptile buds.

With the formation and growth of the lateral stems of the accumulation joint, a secondary system of joint roots is formed. They develop from a secondary root node, unlike primary (apical) roots.

Adequate humidity and temperature during the accumulation phase allow the root to penetrate to a depth of 4-5 cm or more. This leads to more branches and more roots. In our experiment, we would like to note that the Polovchanka variety has a wide range of accumulation properties, because in the smaller number of seedlings the root buds formed a fast and strong stems.

In the experiment, we dug up the roots in some variants and separated them from the soil by washing them in clean water. As can be seen from the data in Table (3.4.4.1), 1.5 mln. In the single-seeded variant, the roots formed from the primary bud weigh 48.3 mg; 3 mln. in variant 44.2; 4.5 mln. 38.3 mg per plant left. And 29.4 mg in 6 million bushels of wheat. He formed. Or when the number of seedlings was quadrupled, the number of roots decreased by 19.1 milligrams. The increase in the number of seedlings negatively affected root growth from a young age.

Nitrogen, phosphorus, and potassium fertilizers were doubled, and root weight was observed in all four variants when seedling numbers were varied. For example, 1.5 mln. while the 3 roots formed from the bud when the seedlings were left were 54.3 mg, the root of the 6.0 million-seed variant variant was 34.2 mg or 20.1 mg less. However, the amount of fertilizer is reduced by 5-10 mg from the above options. This was also observed in the weight of other types of roots. For example; we see that the roots from the accumulation joint grow 10.8 mg or twice less when the weight is N200P140K100 kg \, and 20.2 mg when N100P70K50 kg.

An analysis of the data shows that while the number of seedlings negatively affects the root development of winter wheat, that is, from the beginning of ontogeny, the struggle for inter-vegetative space for the nutrient medium begins. The more roots a plant can produce, the faster it will grow. It was found that 1.5 million to 3 million roots of plants have the fastest growth, 4.5 million seedlings have average growth and 6 million seedlings have slow root growth.

TABLE 3.4.4.1. DEPENDING ON THE SOWING RATE OF DRY ROOT MASS AND THE AMOUNT OF FERTILIZER CHANGE 1 M^2

Options	Air-dried dry weight, in mg			
	Henna leaf roots	Secondary pairs	Primary 3 buds	Collection node roots.
$N_{100}P_{70}K_{50}$				
1. 1,5 mln	5,4	24,2	48,3	10,8
3. 3,0 mln	3,4	11,2	44,2	8,4
5. 4,5 mln	2,8	10,6	38,3	5,6
7. 6,0 mln	2,0	9,3	29,4	4,2
$N_{200}P_{140}K_{100}$				
2. 1,5 mln	8,2	31,3	54,3	20,2
4. 3,0 mln	4,2	18,6	48,4	13,6
6. 4,5 mln	3,6	15,4	42,3	10,4

8. 6,0 mln	3,4	12,3	34,2	6,0

If, in the early stages of development, each plant grows its roots more rapidly to obtain water and dissolved nutrients from the soil, it will lay the groundwork for future growth. As A. Maksimov wrote in 1952, "The root of a plant moves to find water." This means that the roots of the plant must be able to find it from a young age. To do this, the roots need to grow rapidly from seed germination.

Some scientific studies have recognized the rapid growth of the surface of a plant based on the amount of sap (Pasoki) absorbed by the plant's roots. It is believed that all factors are present in the soil only when they are sufficient, especially in temperate conditions, when the amount is higher than in dry lands. In any case, NS Avdonin, EG Minina, OM Trubetskova (3.1) believe that the amount and speed of sap from the roots is an indicator of their rapid growth. They paid close attention to the overall root size and active suction root surface. The study of root size of experimental plants showed that, although it is a quantitative indicator, it shows that the root of wheat is inextricably linked to the number of seedlings.

Influence of NPK content on wheat root size and number of seedlings on suction surface.

№	Options	Root volume is cm^3			Suction surface m^2		
		Gathering	Tubing	Flowering	Gathering	Tubing	Flowering
1	1,5mln. $N_{100}P_{70}K_{50}$	0,38	12,4	12,84	0,054	1,84	2,280
2	1,5mln. $N_{200}P_{140}K_{100}$	0,45	12,6	14,20	0,100	2,11	3,480
3	3,0mln. $N_{100}P_{70}K_{50}$	0,31	11,40	10,41	0,51	1,71	2,270
4	3,0mln. $N_{200}P_{140}K_{100}$	0,40	12,40	11,32	0,99	1,90	3,244
5	4,5mln. $N_{100}P_{70}K_{50}$	0,32	11,20	9,46	0,060	1,46	2,126
6	4,5mln $N_{200}P_{140}K_{100}$	0,38	12,30	9,76	0,76	1,82	3,112
7	6,0mln. $N_{100}P_{70}K_{50}$	0,30	10,10	8,10	0,041	1,81	1,480
8	6,0mln$N_{200}P_{140}K_{100}$	0,32	11,20	8,30	0,44	2,10	1,840

During the tubing phase, the volume of one plant root was 12.4-12.6 cm3 in 1-2 variants. But when the seedlings doubled to 3 million, it was a little less. (11.4-12.4 cm3) When the number of tubes increased by 3 and 4 times, the values decreased by 2-3 cm3 compared to options 1 and 2, and by 10.1-11.2 cm3 in 6 million variants. At the same time, the doubling of mineral fertilizers has led to an increase in this figure, albeit slightly. An increase in root size significantly increases the plant's nutrient uptake.

During the flowering phase of wheat, root development is more pronounced, especially in variants 1,2,3,4, as well as in variants 5 and 6, with a slight decrease in average growth. For example, in option 1-2, the minimum seedling size was 12.84-14.20 cm3, while in option 7-8 it was 8.10-3.30 ms3. This means that when the number of seedlings increases, there are some unfavorable conditions for root development during the flowering phase.

This is because when the seedlings were thick, the light level of the soil decreased from the tube wrapping phase (30-42%) and the roots grew poorly in the unlit soil conditions.

The suction surface of the root is usually taken in m3 to indicate how well the root is working. According to the table, the absorption surface was accelerated in all variants when the amount of NPK doubled.

An increase in the amount of seedling oil was observed during the accumulation phase, which negatively affected this indicator. For example, in the first case, the accumulation phase is 0.054 m3, while in the 7th variant it is 0.041 m3. In the same variant, when the NPK was used twice as much, the suction surface of the root was 0.100 m3 and 0.44 m3. This means that when the rootstock is left with a thick layer of seedlings, even if the amount of fertilizer increases, it remains low. The table shows the numbers 0.41 m3 and 0.044 m3 in options 7 and 8. The data obtained during the germination and flowering phases of wheat show that the number of seedlings, when the amount of NPK is two different, this figure is slightly higher than the growth surface in the root of a plant with a high amount of fertilizer. 'ladi. (2.11 m2 or 0.27 m2 more than 1.84). In the flowering phase, the root absorption phase is significantly increased, especially when the number of seedlings is 1.5 million, when the rate of mineral fertilizers is increased. For example, in Option 1, the figure was 2.28 m3, while in Option 2, it was 3,480 m3 or 1 m3 more. The same thing happened with options 3 and 4. But the number of seedlings is 3 million. At the time, the figure was slightly lower, at 2,270-3,244 m2. The number of seedlings increased from 4.5 million to 6 million, the lowest level (2.46-1.82 m2). An increase in fertilizer application has led to a reduction in absorbent surface area. For example, in option 7, the NPK was 2.480m2 for 100-70-50 kg, while the amount of fertilizer was doubled to 1.840m2. This is the lowest of the experimental options. This is due to the fact that the roots of plants do not have enough space to grow, and their location in the top layer of soil does not provide enough nutrients to the roots.

In the experiment, we also determined during the flowering phase to find out how much substance they can absorb by soaking the roots in methyl blue dye (1.5-2 minutes). Table 3.4.4.3 shows that when methyl dye was immersed for the first 2 times, 6.235mg in 1.5 million seedlings. of fertilizer doubled to 7,833 mg. However, 4.25-4.312 mg of 6 million seedlings, or 2-3.5 mg less than in options 1-2, or 72.66% of methyl blue dye in the container, was doubled. If the fertilizer is increased, it will increase by 78.81% when the fertilizer is doubled. This represents a 6% increase in root utilization. When the number of seedlings was quadrupled (6 million), the absorption of the dye was 4,250-4,314 mg, reaching 1.5 million. absorbed 2.3 mg less than the variant, or only 39.65-33.71% of the dye in the container. At the third time, the mastery decreased slightly and was 52.17-61.20%. But the number of seedlings has grown to 6 million. was 33.90-26-91%, which means that the absorption of the solution is reduced. This indicates that the roots are not very developed. Table 3.4.4.3 shows that the increase in the number of fertilizers and seedlings also has a negative impact on this indicator. (0.612-0.814 m2 to 0.420-0.380 m2) and decreased from 33.1-39.6% of total adsorption to 30.2-26.3%. This means that an increase in the number of seedlings slows down the root activity more than when a rare seedling is left. When the normal number of seedlings per plant is between 3-4.5 million per hectare, the suction surface of the roots is at the normal level or between 50-60%.

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RESEARCH AND VERIFICATION OF URBAN PUBLIC TRANSPORT ROUTES USING MATHEMATICAL METHODS (On the example of the city of Termez)

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ABSTRACT

Demand for public transport is also growing due to the growth of the city's population and the establishment of new manufacturing enterprises and educational institutions. Effective organization of urban public transport services plays an important role in the effective operation of other industrial enterprises, organizations and educational institutions in the region. The article analyzes the demand of the bus transport network and routes in the study area and makes recommendations for its improvement.

KEYWORDS: *Passenger Traffic; Public Transport; Passenger Traffic Quality; Meet The Route Line On Demand, Re-Switch To Another Vehicle, Get On And Off Another Bus Between Neighborhoods.*

INTRODUCTION

The quality of transport services in cities around the world, including the timely and comfortable delivery of passengers to their destinations without excessive traffic jams, modern solutions to existing problems and improving the quality of services are important. Particular attention is paid to the development of new scientific and technical solutions to improve the quality of bus services in developed countries, including major cities such as the United States, Britain, Germany, France, Singapore, Japan and South Korea [1]. Scientific research is being conducted to improve the work of urban public transport based on integrated approaches.

Today, the issues of public transport services depend on many factors, each of which requires a separate approach and a comprehensive solution. The Action Strategy for the further development of the Republic of Uzbekistan for 2017-2021 highlights the issues of "… Radical improvement of transport services to the population, increase of safety of passenger transport and reduction of emissions of harmful substances into the environment, purchase of new comfortable buses, construction and reconstruction of bus stations and bus stations". One of the most pressing issues facing urban bus transport today is the timely delivery of passengers to their destinations.

LITERATURE REVIEW

Many prominent scientists of foreign countries and our country, including E.Ingrid, M.Mistretta, A.Monzon, Bashir Shalaik, Richard Anderson, A.Bristow, M.E.Antoshvili, I.V.Spirin, A.V.Shabanov, V.A.Gudkov, A.M. Bolshakov, L.B.Mirotin, A.V.Velmojin, G.A.Varelopulo, B.A.Xodjaev, G.A.Samatov, S.A.Salimov, Sh.A.Butaev, K.B.Nasretdinov, L.A.Axmetov, V.S.Mun, K.M.Nazarov, A.A.Nazarov, B.I. Abdullayev and others, have focused on improving the technology of passenger transport in city buses, creating a scientific basis for improving the quality of service.

In this regard, it is necessary to optimize the route network, taking into account the strict requirements, given the current level of urban development.

The route network refers to the aggregation of all passenger routes in a city, county, and so on. The route, in turn, represents the path of the vehicle between the start and end stops according to the schedule [2, 3].

The main indicator for assessing the quality of service in buses is the capacity utilization factor, the criteria for its integrated assessment have been improved (B.I.Abdullaev, 2019) [4].

The focus of many researchers is on shaping the set of requirements for route schemes. Researchers [5, 6, 7,] have now formulated criteria for optimizing route networks, including the shortest path between the start and end points of the route, the minimum time spent by all passengers, and so on.

To select the optimal route network, the researchers suggested the use of combinatorial analysis methods (comparing all possible route network options according to different criteria). However, given that for a large city, the number of routes between the studied locations can reach large values, it is almost impossible to compare all the options. Therefore, B.L. Geronimus used the method of combinatorial analysis with oriented selection of options in the formation of variants of route schemes [8].

MV Khrushchev proposed to divide the methods of guidance into two groups depending on the level of tasks to be solved [9]. The first group is designed to build route diagrams for the entire city and is called general routing methods. The local routing methods that make up the second group are designed to fix individual routes.

In many developed countries, urban mobility is one of the major challenges faced by the world's population living in urban environments. This problem has been shown to be a good alternative to a well-organized public transport system to ensure the mobility of a large population (V. H. M. Bins Ely, J. M. Oliveira, L. Logsdon, 2012) [10].

Methods of optimization of individual transport routes are reflected in the work of V.G.Bolonenkov, S. Liberman, Yu. Loginov, I.V.Spirin and others. [11] The authors consider the options of different forms of organization of city routes - regular, Express, semi-Express, high-speed, shortened, combined.

RESEARCH METHODOLOGY

The most common modes of transport in the country are land and road transport. In our country, road transport plays a leading role in urban and suburban transport.

The city of Termez reflects the infrastructure of public transport, the level of public transport, the number of routes, the number of buses (Table 1).

Table 1

Termez city

Level of public transport use (mobility)		
Population of the region:	182.1 thousand. person	
Number of settlements	37	
Number of neighborhood citizen meetings	37	
Bus transportation%	25.4 %	
Population mobility:	1 person uses transport 316 times a year	
Infrastructure		
Lengthofhighways:	313.9 km.	
Numberofroutes:	12	
	hence:	
	bus	10 (83%)
	directional taxi	2 (22%)
Locationofroutes:	city	12 (7,8%)
	aroundtown	15 (9,9%)
	intercity	5 (3,2%)
Number of pick-up and drop-off points:	Bus station and bus station:	2
	Stations:	78
Level of station supply:	- 1 stop every 500 meters. (Required 55 pieces)	

The methodology of writing the article is the Decree of the President of the Republic of Uzbekistan on the quality indicators of passenger service and routes in public transport in the region and their improvement, the works of local and foreign scientists on the development of this area. The research process is based on the extensive use of methods such as economic statistics, expert evaluation, statistical grouping, monographs, and scientific observations.

4. Analysis and discussion of results.

Figure 1 Map of routes of Termez city

Evaluation of the regional route network.Convenient movement of passengers in different modes of transport will depend on the improvement of the system of urban routes.

The main requirement for the urban route system is to ensure that the number of transfers of passengers on one route and another transport within the city area and the time spent on one flight in any direction of the city is minimal. The higher the density of the urban passenger transport network, the greater the chances of passengers reaching their destination without switching to other modes of transport.

Figure 1 Map of routes of Termez city

Cartographic view of Termez city area (***Google Earth***). (Figure 1)

The problem of choosing a bus route scheme in cities and the following basic information is needed to solve it.

• You will need a city map with a transport network that connects these points where buses can move and consists of exit and return points from the streets.

The points of origin and return of passenger traffic are generally understood as the transport districts of the city. Natural and artificial boundaries (rivers, railway lines, etc.) are used primarily when dividing a city into neighborhoods. Transport trunks should, if possible, have axes of symmetry in the neighborhood. Therefore, in solving this problem, it is assumed that it depends on the network of transport, not on the pedestrian crossings and the route scheme from the stop. In this regard, the total time spent by passengers is assumed to be constant, independent of the route scheme and therefore not taken into account in the route selection calculations. The transport network shows the length of each part of it and the time of bus travel through these sections.

The methodology for calculating the scheme of bus routes in cities is considered in a conditional, somewhat simplified example. The exception, for example, does not take into account all the limitations that may exist in the real conditions of a particular city, but in this example the basics are outlined. The considered example is represented by the transport network.

The numbers in the circles indicate the numbers of the dots (microcenter centers); the numbers in the middle of the network sections indicate the travel time of the buses in that section in minutes, and the numbers in parentheses indicate the section length in kilometers. This example shows the adequacy of passenger transport in the estimated period of “high” assumed to be equal to 1 hour (Table 2). This is based on the table. In describing the initial data needed to solve the problem under consideration (PTV Vissim https://www.ptvgroup.com/en/solutions/products/ptv-vissim/), the passenger traffic data was obtained on the basis of a data processing program (gadget).

The first column of the table shows where the points are, and the first row shows the address of the destination. (Table 1)

The proposed route scheme for the division of the study area into quarters is given. Circles represent quarters, and rectangles represent the distance of intermediate routes.

All routes serve one type of bus, each with a capacity of 40 people, taking into account the filling factor. Set for the maximum interval between bus departures Imax-12 min The travel time

between points in both directions is assumed to be equal, although it may be completely different.

The time taken for a passenger to pass at each point is as follows:

№ Breakpoints. 1 2 3 4 5 6 7 8

***t*$_{nep}$.....2 5 5 4 5 5 4 5** Indicator. Identify the shortest paths.

The development of a route scheme consists of several stages. Identify the shortest (in time) paths between points (neighborhoods). Among the many algorithms for solving the shortest path problem, the most accurate are the following, which consists of two steps.

Phase 1. Let 0 be loaded on the starting node of the network.

Indicator. Identify the shortest paths

Phase 2. In our example, the first nodes have potential and the last ones do not. We define the potentials of the last nodes as the sum of the potentials of the initial nodes and the time of bus movement along the link connecting the initial and final nodes. We select the end and write the node with the lowest potential next to the node and mark the link with an arrow.

All nodes that are repeated until step 2 are assigned potentials. In our example, the first starting node is 1. We assign this to the potential of 0.

Step 2 . You need to compare the two values 0 + 3.4 = 3.4 and 0 + 3.8 = 3.8 We choose the end node with the minimum potential. This is 2 points. We write a potential 2 close to this point and mark the link with a 1-2 sign.

Where from	**Where to**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	-	90	180	110	190	110	120	140
2	110	-	120	170	150	80	120	80
3	100	110	-	190	110	110	90	75
4	90	100	90	-	210	70	82	70
5	150	125	104	80	-	100	100	65
6	95	90	97	90	210	-	98	80
7	110	120	100	120	130	110	-	78
8	120	100	122	110	125	118	80	-

Wher from	Where to							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	-	2	2 2,7	3 5,5	3,4 8	3,4,5 9.7	2,8 8.9	2 6,5
2	2	-	2,7	3 3.6	3,4 7, 1	3,4,5 8,8	8 8,9	4,5
3	2,7	1,8	-	2,8	4 5, 3	4,5 7	8 7	4,6
4	3 5,5	3 4,6	2,8	-	2, 5	5 4,2	5,6 5,8	5,1
5	4,3 8	3 7,1	4 5,3	2,5	-	1,7	6 3,3	6,7 5,7
6	5,4,3 9,7	5,4,3 8,8	5,4 7	5 4,2	1, 7	-	1,7	7 4
7	8,2 8,9	8 6,9	8 7	6,5 5,8	6 3, 3	1,6	-	2,4
8	6,5	4,5	4,6	5,1	7,6 5, 7	7 4	2,4	-

Repetition Step 2. The comparison results are 0 + 3.4 = 3.4, 34 + 3.8 = 7.2. The choice is the smallest of these potentials, which point means 2. We write it closer to this point and mark 1-2 with the reference arrow. If we continue this process, we get all the potential to the point.

Arrows with signs indicate the shortest path from point 1 to all other points. The results of these calculations are recorded in Table 3, where the corresponding cells in the upper left corner are the points with the shortest path and the lower-right corner is the time of movement between the start and end. For example, Table 2 shows that the shortest path from point 1 is through point 2 and point 3, and the time limit for the route (excluding transfer time) is 12 minutes. Similarly, calculations are performed for all points, each of which is taken sequentially as a starting point, and the results are entered in Table 3, which identifies all the shortest routes between all points on the transport network. [12]

II. Stage. Create an original route diagram. The scheme was adopted as the initial route scheme, which included continuously sufficient, minimal, purposeful routes through the routes, as well as partial routes that did not coincide with the route. As a route, we consider the route connecting the centers of three or more neighborhoods along the shortest route based on the time taken to cross the road.

A sufficient condition for an appointment by route is that the waiting time of the bus passenger at the starting point of the route is less than or equal to the time he has to spend at the transfer point to meet the natural requirement.

$$\frac{cqT_P}{\rho} * \frac{1}{P_{ij}} \leq t_{n_l}$$

c is the coefficient of roughness of the approach of passengers to the stop (assumed to be 0.5);

q is the capacity of the bus used (in our example, 40 people are accepted);

$\boldsymbol{Tp}$ is the duration of the period, min (60 min in our example);

$\boldsymbol{\rho}$ is the hourly coefficient of passenger flow inequality (assumed to be 1.1);

$\boldsymbol{P_{ij}}$ −is the maximum number of passengers traveling between the endpoints of the desired route on the route of maximum passenger traffic;

$\boldsymbol{t_{n_l}}$ is the time l spent by a passenger to travel to the destination, the point marked by the route i in the direction j and the end users j with the minimum duration of the transfer relative to other intermediate points on the road between the starting point, maximum passenger traffic.

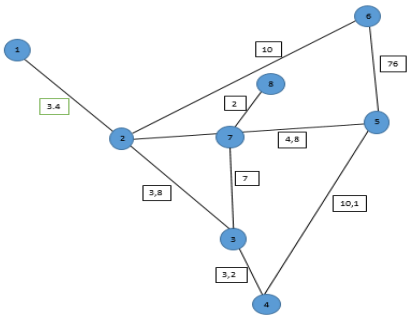
Routes that meet this condition are included in the original bus route scheme. In the example under consideration, we analyze the observance of a possible sufficient condition through the routes. The ratio of 1-3 above in the direction is as follows:

$$\frac{0.5 * 40 * 60}{1.1} * \frac{1}{180} < 5$$

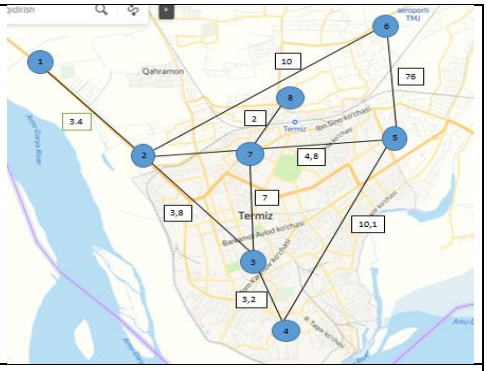
Since the left side of the inequality is larger than the head, i.e., the waiting time is longer than the transfer time, route 1-3 is not assigned. The same is true in lines **1-4**:

$$\frac{0{,}5 * 40 * 60}{1{,}1} * \frac{1}{110} > 3$$

All other routes are checked in the same way. However, it is given by the directions 1-8, 5-5, 6-7, 2-4 considered in the example.



Route scheme of Termez city



Route scheme on the map of Termez city

The proposed route scheme for the division of the territory of the city of Termez into districts is given (Figure 2).

Plot routes do not match these routes 1-8, 7-8. These routes should also include the bus route diagram in the original version. Thus, in this example, the original route diagram is shown in six directions 1-8.2-4.6-7.7-8.6-4, Indicator (**Figure 2**).

CONCLUSIONS AND SUGGESTIONS

Today, we can observe that the concentration of routes on the city's central highways generally leads to a decrease in the efficiency of the main network. Therefore, in the current situation there is a need to adapt the existing algorithms for the formation of route networks in the city of Termez to the modern conditions of urban planning.

Based on the above analysis, it is recommended that bus routes with urban routes be selected correctly, i.e., that new routes be opened, and that this measure improve the following indicators:

• Saves time for passengers to get to the station;

• The number of re-entry of passengers to other destinations will be reduced;

• Saves time for passengers to travel to their destinations by public transport;

• The level of branching of the network of routes in the region will increase;

• The quality of transport services will be improved.

• Saves time by improving bus route schemes;

• choosing the optimal route and adhering to and improving walking time intervals;

These analyzes serve as an aid to the development of a master plan for public transport in Termez [14]. In the next scientific articles, the selection of the route scheme and finding the optimal route line by mathematical methods will be continued in the next 3-4 steps in the next scientific articles.

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CLASSIFICATION OF FAULTS IN A HYBRID TRANSMISSION LINE SYSTEM WITH OVERHEAD AND UNDERGROUND CABLES

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ABSTRACT

This paper shows how to classify faults on a hybrid transmission line. The coefficients of discrete wavelet transform were used to evaluate current signals (DWT). To decompose high frequency components from fault signals, Daubechies4 (db4) is used as the mother wavelet. ATP/EMTP is utilized to mimic fault signals from current signals in this study. In the instance of single circuit single conductor with overhead and underground, a hybrid system between overhead line and subterranean cable of 115 kV from Provincial Electricity Authority (PEA-Thailand) was utilized as a simulated case study. The location of the fault, the kind of fault, and the angle of the fault has all been considered. Using MATLAB software, DWT is then applied to phase current and zero sequence signals in order to produce a coefficient in scale 1 for further analysis. This value is mostly utilized in the development of fault classification algorithms. The research's findings are satisfactory.

KEYWORDS:*Wavelet Transform; Overhead Line; Underground Cable; Fault Classification.*

1. INTRODUCTION

Transmission is divided into two types of installations: overhead transmission lines and subterranean transmission lines, each with its own set of applications. Because overhead transmission lines are easy to construct and cost less to install, they are widely used. However, it has certain drawbacks, such as poor dependability and the ease with which faults may arise. Underground transmission lines are often found in high-traffic regions or tourist destinations. When compared to overhead transmission lines, this kind of installation is quickly growing due to its excellent dependability and scenic attractiveness. As a consequence, the number of connecting points between the overhead line and the subterranean cable increases. Furthermore, the characteristics of both kinds of transmission lines are different. This may impair the protection system's ability to detect and diagnose faults, posing a risk to the power system. The categorization of faults in power transmission networks is complicated. For fault classification, the article employs a Decision-Tree Based Method.[1] Full-cycle discrete Fourier transform (FCDFT) and half-cycle discrete Fourier transform (HCDFT) are used to analyze voltage and

current (HCDFT).The accuracy of HCDFT is higher than that of FCDFT. A Distance Relay-Prevention Classification Approach Using Support Vector Machines was proposed. Two SVM-based classifiers have been suggested to be utilized in this study. SVM-1 is used to quickly identify problems in the system, whereas SVM-2 is used to differentiate between power fluctuations and voltage instability occurrences. Fault Detection and Classification Approaches in Transmission Lines Using Artificial Neural Networks was shown in the article. This method is based on treating each phase's current and voltage separately. In a relatively short period, the ANN outputs are utilized to identify the problem kind. Investigated Fault Detection and Classification for Compensating Networks Using Combination Relay and ANN. Data collected using Digital Signal Processing (DSP) and Artificial Neural Network (ANN) based on various methods is used to classify the issue. The RMS values of phase voltage, phase current, and phase voltage angle are used as inputs, and the results are compared. For fault classification,[2] the wavelet transform will be used in the majority of the studies . The Discrete Wavelet Transform was used to classify faults in Thailand's transmission lines. This utilized spectral energy extracted from detail coefficients (level-4) of fault currents using the discrete wavelet transform (DWT). For all kinds of defects, the suggested approach performs well. In the publications, the wavelet singular is used. The application of maximum singular value energy for defect detection and classification is discussed in the article. For the identification and categorization of defects in transmission lines, a method based on the wavelet singular entropy (WSE) approach is given. For fault analysis, the articles utilized the Discrete Wavelet Transform (DWT). The Wavelet Based Alienation[3] Algorithm was used to detect and classify faults in transmission lines . Alienation coefficients based on approximate breakdown of three phase currents from both ends may be used to assess fault detection and classification. Wavelet transform and Artificial Intelligence were used to evaluate fault in the articles. With the assistance of the wavelet transform, reported an application of a particle swarm optimization (PSO)-based multi-layer perceptron neural network in identifying defects in transmission lines. The results indicate that the suggested method achieves a very high level of accuracy. With acceptable results, the wavelet transform may be used to evaluate and categorize faults. As a result, this study suggests using the wavelet transform to analyze faults on a hybrid transmission line. The behavior of the wavelet transform coefficients will be investigated in order to develop fault classification methods. The simulated system is Thailand's Province Electricity Authority (PEA) 115 kV transmission line. On overhead lines and subterranean cable, the transmission model using Single Circuit Single Conductor is considered[4]. Figure 1 depicts the arrangement structures. Overhead wires placed on a 22-meter concrete pole and subterranean cables installed in a duct bank and 1.5 meters deep in the earth are seen. In the simulation, the EMTP/AT Draw program was utilized. The simulation system consists of a 40-kilometer transmission line connecting two substations. At the half-way point of the transmission line, there is a changeover between overhead and subterranean cable (20 km). Figure 2 depicts a transmission system diagram. Simulations were run with different modifications in system settings to assess the effectiveness of the proposed categorization algorithm: For the instants of fault initiation, the angles on phase A voltage waveform were 0-330 .There are four types of faults: single line to ground, double line to ground, line to line, and three phase fault.10 percent, 20 percent, 30 percent, 40 percent, 50 percent, 60 percent, 70 percent, 80 percent, and 90 percent of the length of the transmission line measured from the sending end to the receiving end are identified as fault locations on any phases of the transmission line. The EMTP/AT Draw program generated a signal with a sample rate of 100 kHz and switch responses for format and time that the fault would occur. The problem occurred at t=0.04 s and was simulated for 5 cycles (0-0.1 s) without clearing[5] the fault. Depicts a single line to ground fault in phase A situated 12 kilometers from the sending side, whereas Figure 4 depicts a line to line fault in phases B and C located 12 kilometers from the sending side. When a defect develops in a transmission line, as shown in Figures 3 and 4,

current on the fault phase increases substantially in both ends and on the load side. The high frequency component [6]dominates the fault characteristics. The Wavelet transform may be used to extract and evaluate this component. The Discrete wavelet transform (DWT) was used to examine a fault signal by extracting the high frequency component (Detail) in order to assess changes in different scales and frequency ranges. These data will be examined in order to develop fault classification by studying the features and behavior of coefficients. Fault signal analysis has been performed on both sides of the transmission line by collecting fault signals from the EMTP/AT Draw program and transforming them into different network sequences. Figure 1 discloses. The structure of transmission lines between overhead line and underground cable

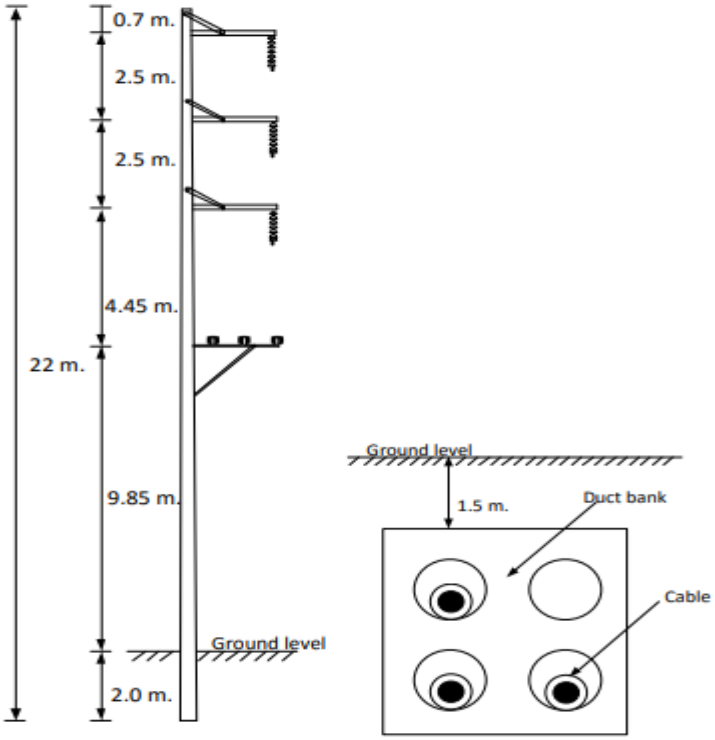

Figure 1: The structure of transmission lines between overhead line and underground cable.

2. DISCUSSION

An iterative method may be used to concentrate energy on a passive source, such as a kind of isolated reflector. The TRM sends off a plane wave that moves toward and is reflected by the target. The reflected wave reaches the TRM, giving the impression that the target has sent out a (weak) signal. As is customary, the TRM reverses and retransmits the signal, sending a more concentrated wave toward the target. The waves get more concentrated on the target as the procedure is repeated. Another option is to utilize a single transducer in conjunction with an ergodic cavity. An ergodic cavity, by definition, is one that allows a wave to originate at any place and travel to any other point. An unevenly shaped swimming pool is an example of an ergodic cavity: if someone jumps in, the whole surface will eventually ripple with no apparent pattern. A wave beginning at any place will reach all other locations an unlimited number of times if the propagation medium is lossless and the borders are perfect reflectors. This feature may be taken advantage of by recording for a long period with a single transducer to capture as many reflections as feasible. The time reversal method is based on a property of the wave equation known as reciprocity: if a wave equation solution exists, then its time reverse (with a

negative time) is also a solution. Because the conventional wave equation only has even order derivatives, this happens. Although certain media are not reciprocal (for example, extremely lossy or noisy media), many others, such as sound waves in water or air, ultrasonic waves in human bodies, and electromagnetic waves in free space, are. In addition, the medium must be somewhat linear[7]. A matching filter may be used to simulate time reversal methods. If the original signal is a delta function, the received signal at the TRM is the channel's impulse response. The TRM effectively auto correlates the impulse response by sending the reversed version back via the same channel. The origin, where the original source was, has a peak in this autocorrelation function. It's crucial to understand that the signal is focused both in space and time (in many applications, autocorrelation functions are functions of time only).The TRM may also be thought of as a "channel sampler" in a time reversal experiment. The TRM monitors the channel during the recording phase and utilizes that information to focus the wave back to the source ideally for transmission.Mathias Fink of the ÉcoleSupérieure de Physique et de ChimieIndustrielles de la Ville de Paris is a renowned researcher. His team has conducted many ultrasonic TRM tests. A single source transducer, a 96-element TRM, and 2000 thin steel rods placed between the source and the array were used in an intriguing experiment. Both with and without the steel scatterers, the source delivered a 1 s pulse. In the retransmission phase, the source point's temporal and spatial widths were measured. With the scatterers, the spatial breadth was approximately 6 times smaller than without. The spatial breadth was also smaller than the diffraction limit, which was defined by the size of the TRM with the scatterers. Because the scatterers improved the array's effective aperture, this is feasible. The focusing was still very excellent even after the scatterers were shifted slightly (on the order of a wavelength) between the receive and transmit stages, demonstrating that time reversal methods may be resilient in the face of a changing medium. Furthermore, José M. F. Moura of Carnegie Mellon University was heading a research team attempting to apply Time Reversal concepts to electromagnetic waves, and they were able to obtain resolution beyond the Rayleigh resolution limit, demonstrating the effectiveness of Time Reversal methods. Their research focuses on radar systems, with the goal of improving detection and imaging methods in extremely crowded settings, where Time Reversal techniques seem to be most useful.The beauty of time reversal signal processing is that no knowledge of the channel is required. The process of transmitting a wave across the channel essentially measures it, and the data is used to concentrate the wave during the retransmission phase. To optimize the system, one does not need to solve the wave equation; all one has to know is that the medium is reciprocal. As a result, time reversal is well suited to applications using inhomogeneous material. The fact that time reversal signal processing employs multipath propagation is an appealing feature. Multipath effects must be compensated for and corrected in many wireless communication systems. By using the energy from all routes, time reversal methods take use of multipath. Fink envisions a cryptography application based on ergodic cavity geometry. The key would be made up of two transducer sites. One plays the message, while the other captures the waves as they bounce about the cavity; this recording will appear as noise. There is only one place to launch the waves from in order for them to concentrate when the recorded message is time reversed and played again. Only one other place will show the focused message wave if the playback location is accurate; all other locations should seem noisy.

A geomagnetic reversal is a shift in the magnetic field of a planet in which the magnetic north and south poles are reversed (not to be confused with geographic north and geographic south). The Earth's field has cycled between times of normal polarity, in which the main direction of the field was the same as it is now, and periods of reverse polarity, in which the opposite was true. These intervals are referred to as chrons. The incidence of reversals is statistically random. Over the past 83 million years, there have been 183 reversals (one every 450,000 years on average). The most recent, the Brunhes–Matuyama reversal, occurred 780,000 years ago[1], with estimates of how fast it occurred varied considerably. According to some sources, the time it takes for a

reversal to complete is approximately 7,000 years on average for the four most recent reversals. According to Clement (2004), the length is influenced by latitude, with shorter durations at low latitudes and greater durations at mid and high latitudes. [2] The time it takes for a complete reversal to occur varies, but it usually takes between 2,000 and 12,000 years. Although there have been times when the field reversed worldwide for many hundred years (such as the Laschamp excursion), these occurrences are classed as excursions rather than complete geomagnetic reversals. Large, fast directional excursions, which occur more often than reversals and might be interpreted as unsuccessful reversals, are common in stable polarity chrons. The field in the liquid outer core reverses during such an excursion, but not in the solid inner core. Diffusion in the liquid outer core takes 500 years or less, while it takes 3,000 years or more in the solid inner core[8].

3. CONCLUSION

The wavelet coefficient analysis for faults was proposed in this paper. categorization based on a hybrid 115 kV system that includes both overhead and underground lines as well as subterranean portions The location, kinds, and severity of the defectIn order to assess all impacts, fault angles were changed. This may have an impact on the categorization of faults. The present situation There has been a signal on every phase and zero sequence signals. MATLAB software was used to apply the wavelet transform. The location, kinds, and angles of faults were discovered as a consequence of the investigation. Influenced the detection coefficient every case study, on the other hand, is unique. have a similar pattern in which the value of the coefficient is abruptly increasedwhen a problem arises This feature may be used to identify[9]faults. In the transmission line detection The data was then split in half (540 instances) and analyzed. in order to develop a defect classification method, it was discovered that for the initial peak value of the coefficient from the current signal's DWTAfter identifying flaws, phase X was utilized for comparison.Identification of the fault type The remaining half of the data (540 instances) will be analyzed.The accuracy is 81 percent when used in the circumstances indicated in Table I.This equates to 82.22 percent accuracy on the transmitting side and accuracy on the receiving side.In both cases, it may be identified with the maximum accuracy of 98.14 percent.both the transmitting and receiving sides Double line to has the least accuracy[3].

The transmitting side has a 55.55 percent ground fault rate, whereas the load side has a 48.76 percent ground fault rate Type of fault he number of lines toa fault in the earth From line to line,faultadd a second line toa fault in the earth three-phase processfaultIn transmission on hybrid, there is a transform on fault categorization. System of transmission (Overhead and underground). TheIn terms of results, the approach may provide acceptable results.accuracy. As a result, it may be developed further by incorporating to improve accuracy and rescue calculations, artificial intelligence is being used. Time to enhance the security system and boost the power dependability of the system[10].

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AN OVERVIEW ON VIRTUAL POWER PLANT

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ABSTRACT

Controlling frameworks are still in use for a long time; they are the frameworks that control the flow and yield of the framework. The present examination paper discusses the virtual force plant, which is important in the construction of control frameworks. Many papers have been distributed with respect to the virtual force plant age of power, which is defined as the creation or age of power, followed by the transmission of power, which is virtual in light of the fact that there is an integrated associating gadget of all the components that connects all the force assets and structures a network that is ready to move power. When the supplied energy cannot meet the demand for electricity, virtual force plants become a viable option. The necessity for virtual force plants, their usage, and where all environmentally friendly power assets combine to provide power consistently are discussed in this article, as well as how a mixture of various virtual force plant mixes may solve power problems and increase proficiency.

KEYWORDS: *Controller, Control System, Gain, Virtual Power Plant, VPP, Open And Closed Loop.*

INTRODUCTION

In the electricity industry, virtual power plants are becoming a driving factor. This article describes how they let utilities and aggregators to pool output from various plants and dispersed sources, allowing them to participate and trade in the energy market with the flexibility and scale they need. The energy scene is shifting. Megatrends are causing global disruption in the energy and manufacturing sectors. Greater urbanization, a push for decarbonisation, and the rising impact of digitalization are altering how industrial products are manufactured across the globe, as well as how people use and generate energy. As a result, a power grid change is underway. It's altering the way electricity is produced, delivered, and used. Due to technology advancements, cost reductions, new business models, and supporting regulations, the transition from a conventional grid to a new smart, decentralized grid with bi-directional energy and information flow has quickened in recent years[1]. The worldwide shift toward renewable and distributed power production, which is significantly altering the energy environment, is one of the most important forces pushing change. Smaller, decentralized power generating units will dominate the market as the globe advances deeper into the energy transition toward a low-carbon future.

As a consequence, generation is moving from bulk, centrally managed power facilities to dispersed, weather-dependent sources, creating a complicated operating environment. Grid operators must now focus on controlling and optimizing those systems in a reliable and profitable manner. However, going beyond the fundamental needs has a distinct advantage, since changes in the energy environment offer a compelling chance to fully use the advantages of digitalization[2].

The framework utilized to manage the framework and its stream also yields and provides criticism to the information framework in accordance with the information framework's yield. Those items that establish themselves for humanity were developed with the help of designers and experts. In control framework design, a controllable framework is designed that also provides feedback to the framework so that it may improve its efficacy. Control framework engineers are focused on evaluating and managing pieces of their present situation, as well as control frameworks, to provide critical typical or precise value items for society and the environment. In view of the way that a superior frameworks control necessitates the frameworks to be sharp and visible, the goals of analysing and regulating are complementary. Control frameworks design is also used as a good way to control breakdown frameworks; compound cycle frameworks are an example of this kind of framework. Regulate engineers' current task is to show and control today's perplexing, interconnected frameworks, such as traffic signal frameworks, synthetic cycles, and automated frameworks. A few of the experts also have the ability and experience to operate contemporary robotization systems. The primary goal of control framework design is creating control frameworks according to the required yield that will benefit society[3].

Control frameworks design incorporates the concepts of organization hypothesis and correspondence hypothesis, as well as the development of framework criticism inquiry and direct framework examination. As a result, control framework design is not constrained by any standard or guideline, and it is suitable for aircraft design, compound design, structural design, and electrical design. Control framework design, for example, consists only of electrical, mechanical, and synthetic components[4]. A control framework is a collection of components that work together to create a framework architecture that produces the best possible response. The establishing provided by the direct framework hypothesis, which accepts a cause impact connection for the components of a framework, is the reason for examining it. As a result, a square may speak to a component or a cycle that has to be managed.

The info yield relationship refers to how the information sign is handled to produce a yield signal variable, which is often combined with a force intensification. An open-circle control framework is a framework without feedback that utilizes a regulator or control actuator to achieve the optimum response. This article provides information on the virtual force plant's display and activity. A virtual force plant is a framework made up of a variety of heterogeneous force assets that is used to fill or manage the power flow in metropolitan zones and provincial territories. A virtual force plant is a distributed computer architecture that is used to connect heterogeneous energy assets, also known as scattered energy assets[5]. Appropriate energy assets have a great potential to connect with all power markets and form connections between them. Virtual force plants are a collection of several heterogeneous energy assets that are linked together to form a matrix that attacks distributed computing. Virtual force plant proves to be productive, and it may extract data about the power market to assist and find methods to improve the efficiency of transmitted energy so that it can achieve maximum effectiveness or limit. It displays the VPP structure in a different way[6].

In recent years, the idea of integrating tiny producing units into the power grid has received a lot of interest. Furthermore, distributed generation (DG) is critical in bolstering the major producing

power plants to meet rising electricity demand. Unlike main power plants, DG may be readily linked and withdrawn from the network, allowing for more flexibility. Economic savings through reduced power losses, increased dependability, and better power quality are just a few of the advantages of properly designed and managed DG systems. However, increasing DG penetration without generating unit harmony may result in higher grid power losses, unattractive voltage profiles, unreliable protection device functioning, and a mismatch between actual use and output[7]. As a result, DER units should be visible to the system operator in order to ensure the most cost-effective operation of the main network. The negative consequences of increasing uncoordinated DG penetration are the driving force for the VPP concept's debut. VPP is the aggregation of DG units, controlled loads, and storage devices linked to a specific cluster into a single conceptual entity in charge of regulating the electrical energy flow inside the cluster as well as in exchange with the main network. With its framework, the VPP idea was suggested early on. Previously, DER were deployed in a “fit and forget” manner and were not visible to system operators. VPP combined all DERs into a single entity, giving DERs the same system visibility, controllability, and market effect as transmission-connected generators[8].

Various research looked at the VPP idea from three perspectives:

- The first direction is responsible for categorizing DGs within the VPP hierarchy according on their capacity as well as ownership. Domestic DG (DDG) and Public DG were the two categories reported (PDG). Another DG categorization was given based on whether they were stochastic or dispatch able in nature.
- The second approach concentrated on the technical and commercial structure of VPPs, including Technical VPP (TVPP) and Commercial VPP (CVPP), as well as their capabilities.
- The third path is geared at improving the VPP operation. Some of these research focused on optimizing the VPP structure by choosing the best size and placement for the VPP components. Other research, on the other hand, focused on the VPP's profit maximization.

A literature overview of VPP definitions, components, and framework is presented in this article. It also makes the relationships/correlations between VPP structure elements and their duties easier to understand. Finally, a review of the many methods that may be suggested to improve the functioning of the VPP is given[9].

1. Framework VP

Under a layer of Information and Communication Technologies, VPP is a big entity that includes a large number of DGs, controlled loads, and storage components (ICT). VPP is in charge of managing and regulating the flow of electrical energy not just inside its cluster, but also in exchange with the main grid. Auxiliary and power quality services are also available via VPP. VPP needs have the following tools in order to do these functions:

- Information and communication technology infrastructure.
- Applications for monitoring and control.
- At the customer's location, smart metering and control devices are installed.
- Software programs for predicting the VPP's electricity generation.

VPP is split into two categories for specialization: Technical Virtual Power Plant (TVPP) and Commercial Virtual Power Plant (CVPP) (CVPP). In order to accomplish the VPP functions, these two entities work together. The following are the functions and duties of TVPP and CVPP.

2. Virtual Power Plant (Technical) (TVPP)

TVPP is in charge of ensuring that the DER and ESSs are operating properly in order to control energy flow within the VPP cluster and to provide ancillary services. The CVPP provides TVPP with information on the contractual DGs and controllable loads, which must include the following:

- Each DG unit's maximum capacity and commitment.
- The prediction for production and consumption.
- Loads and DG units' locations.
- The capacity of energy storage systems and their locations.

According to the contractual requirements between the VPP and the loads, the available control strategy of the controllable loads at all times throughout the day. TVPP guarantees that the power system is managed in an efficient and secure manner, taking physical limitations and possible services provided by VPP into consideration, based on information received from the CVPP in addition to comprehensive information about the distribution network architecture.

The TVPP performs the following functions:

- For distribution system operators, managing the local system (DSO)
- Balancing, network management, and auxiliary service execution are all part of the job.
- Giving the transmission system operator (TSO) access into the distribution network's DERs, enabling DG and demand to participate in transmission system management operations.
- Managing the DER operation in accordance with the requirements derived from CVPP and system status data.
- Continuously monitoring the status of the equipment in order to get previous loadings.
- Asset management, which is backed up by statistics.

3. Virtual Power Plant For Commercial Use (CVPP)

CVPP views DERs as business entities that provide the price and quantity of energy that they can supply, allowing the VPP portfolio to be used more efficiently in the electricity market. Both the DG units and the consumers have bilateral contracts with CVPP. The information from these contracts is provided to the TVPP so that the quantity of contracted electricity may be taken into account during technical investigations. Individually, small-scale DG plants are unable to engage in the power market.

As a result, CVPP brings these units to the attention of the energy market. The following is a list of CVPP functionalities:

- Production scheduling based on anticipated customer requirements.
- Trading in the energy wholesale market
- Portfolio balancing and/or trading
- Assisting the system operator with his or her tasks
- Submitting the features, prices, and upkeep of DERs
- Forecasting production and consumption based on weather and demand characteristics.
- Demand management during outages

- Developing and submitting DER bids to the energy market.
- Generation scheduling and daily optimization
- In the electricity market, selling DER power.

CVPP works with the following entities in order to accomplish the above-mentioned goals:

3.1. DER:

Its primary goal is to close the imbalance between supply and demand. Its production must be planned, predicted, and the information transmitted to the TVPP.

3.2. • Balance Responsible Party (BRP):

A BRP is an energy trading business that has the ability to make its own production/consumption plan accessible for TVPP to utilize.

3.3. • Transmission System Operator (TSO):

This entity is responsible for maintaining the network's immediate supply and demand balance.

3.4. • TVPP:

It gets information from CVPP and considers it while optimizing the VPP's functioning and interaction with the main grid.

LITERATURE REVIEW

Several papers on power generation, appropriation, and transmission, as well as a few papers on virtual force plants, have been distributed, and among them is a paper titled "prologue to control foundations," which examines what a control framework is and how control framework design aids in the control of large force plants. There are two types of force plants: opened circle and closed circle control circuits. Examine the use of the input control framework and the criticism framework in control design. In charge framework design, regulators such as relative regulators, fundamental regulators, subordinate regulators, and matching vital differential regulators are used. Variable contribution of the framework offers variable yield, as well as controllability of various frameworks such as heat plants, wind power plants, and so on. It also provides information on the historical background of programmed control. The project's methodology is based on parallelization. When overflow power is available, it will verify the excess force rating and, if it is accurate, it will decrease the electrical force of the CHP and activate the kettle. If the overflow power is turned off, check whether there is a power shortage. If there is, purchase power from the lattice. If there is, check if the force shortfall is supplied by taking power from the network. If there is, end your advancement control. If not, stop the most un-beneficial modern app[10].

A complete definition is provided based on the definitions given. “A concourse of dispatch able and non-dispatch able DGs, energy storage elements, and grid connected supplemented by communication and information technology to form a single imaginary power plant which thus plans, monitors, and collaborates the power flows here between component to try and reduce generation costs, try and reduce greenhouse gas production, and maximize efficiency,” according to the VPP definition.

DISCUSSION

VPP is a relatively new yet appealing idea that requires much study in order to be implemented. This article provides a thorough assessment of the literature on various VPP definitions, components, and their relationships. For a better understanding of the VPP idea, the VPP

structure is described, as well as the capabilities of the TVPP and CVPP. A review of several optimization methods attempts to improve either the VPP structure or the VPP operation under consideration. The optimum size and placement of DG units and ESEs, the optimal load management, and the optimal measuring device location were all part of the VPP structure optimization. The necessary goal functions, as well as optimization methods, are emphasized for optimum VPP functioning. The survey results assist researchers in gaining a deeper knowledge of the VPP framework and functioning, as well as identifying the optimization tools and goals needed to fulfill the VPP idea.

CONCLUSION

The virtual force plant is essentially a distributed computer architecture that is used to combine heterogeneous energy assets, also known as circulating energy assets (DER). Appropriate energy assets offer a fantastic potential to connect with all power markets and form connections between them. Virtual force plants are a collection of several heterogeneous energy assets that are linked together to form a lattice for distributed computing. Virtual force plant demonstrates that it is capable of separating facts about the power market in order to assist and find methods for transmitted energy effectiveness, allowing it to achieve maximum productivity or limit. When we plant any framework, we have to look at the whole cost of the framework, thus the major practical advantage of virtual force plants for circulating energy asset (DER) owners is the most extreme profit from the power displays and reduced financial risk. The important segments of the virtual force plant (VPP) with dispatch competent force plants and discontinuous producing unit's adaptable loads and capacity units have been focused in a short time, according to this research. Also discussed were the main components of the virtual force plant (VPP), namely CVPP and TVPP, as well as virtual force plant-related demonstrations.

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FAULT DIAGNOSIS IN UNDERGROUND POWER CORDS USING COMPLEX WAVELET ANALYSIS

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ABSTRACT

Signal processing methods may be used to identify faults in underground power lines by analyzing voltage and current data. We investigate the possibility of using sophisticated wavelet analysis to identify faults in this paper. We use continuous wavelet transform (CWT) to integrate complex wavelets and compute impedance from voltage and current data in the wavelet domain. The magnitude and phase distributions of the impedance are then investigated under different circumstances. We put our analytical method to the test using data from several kinds of cables. The findings demonstrate that a sophisticated wavelet analysis-based method may generate distinct fingerprints for distinguishing between different types of data.

KEYWORDS: *Power Cable, Impedance, Communication Cable, Wavelet Analysis, And Continuous Wavelet Transforms, Fault Detection.*

1. INTRODUCTION

Over time, underground power lines degrade. It is critical to identify faults and estimate the remaining life of cables in order to guarantee the stability of power delivery systems. The voltage and current signals obtained with the wires are typically used to identify faults .We looked at different signal processing methods for defect detection before. Fast Fourier transform (FFT) , short-time Fourier transform (STFT) , and discrete wavelet transform (DWT) were among them. All of them produced acceptable results, with the DWT-based detection seeming to be the most trustworthy. We investigate the possibility of using complex wavelet analysis for fault detection in this article. For the wavelet transform in complex wavelet analysis, a complex valued mother wavelet is used. The resultant wavelet coefficients are all complex valued, allowing for independent extraction of magnitude and phase information. The wavelets in the prior DWT-based detection were entirely real valued. As a result, it was unable to offer critical phase data for study.In this paper; we look at the continuous wavelet transform (CWT) in addition to complex wavelets. CWT, unlike DWT, produces coefficients on continuous scales rather than discrete scales. The much expanded number of scales allows for considerably more signal information to be analyzed. We compute the impedance using voltage and current data in the wavelet domain, as we did in our prior research.[1] We look at the magnitude and phase data

to see what features are linked with different cable kinds.The analytical method is then put to the test using data collected from three cables with various failure situations. Mother wavelets of complex values are used in complex wavelet analysis. As a consequence, the wavelet coefficients computed are also complex valued. Complex mother wavelets come in a variety of shapes and sizes. We use complicated Gaussian wavelets in this work. The p the derivative of the following complex Gaussian function yields a mother wavelet with parameter p. Cp is a normalizing factor that ensures the derivative has a unity norm. Figure 1 discloses the Time-scale plot of the impedance magnitude, generated from data set 1 of the normal cable.[2]

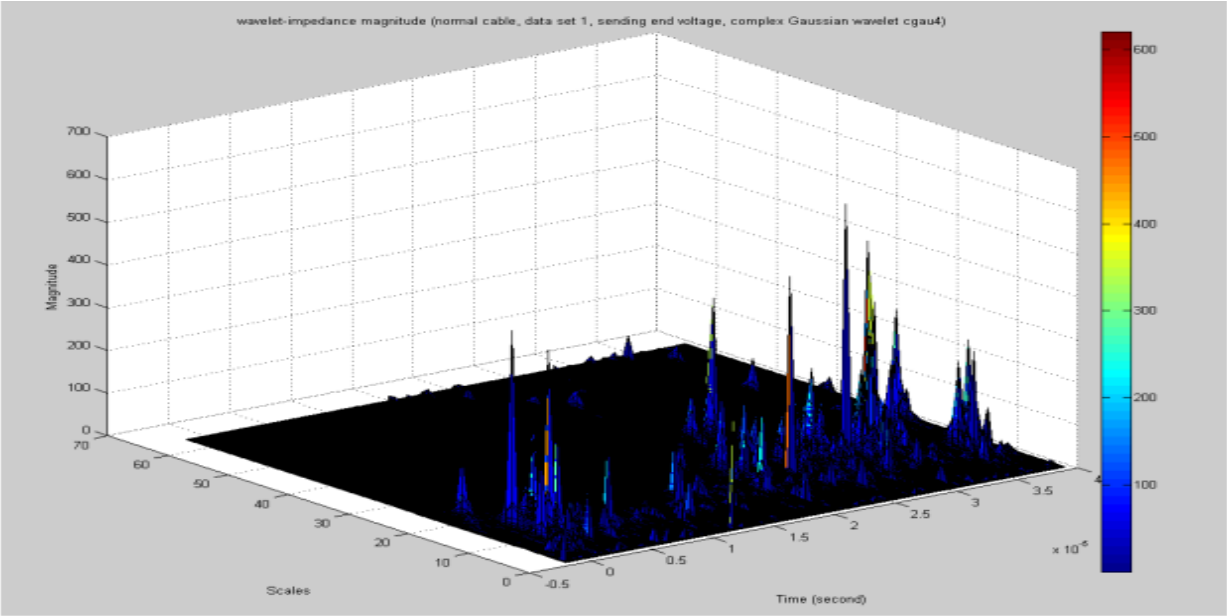

Figure 1: Time-Scale Plot Of The Impedance Magnitude, Generated From Data Set 1 Of The Normal Cable[3]**.**

The Continuous Wavelet Transform (CWT) is a kind of wavelet transform that is The scale parameter is a, the position (time) parameter is b, the signal being converted is f(t), the mother wavelet is (t), and the complex conjugate of (t) is *(t) (t).CWT compares the signal f(t) to wavelet functions that reflect various scales and temporal locations. C(amble(t),(t)) provides a multiresolution analysis of the signal in both the frequency (i.e. scale) domain and the time domain. The mother wavelet is scaled (using parameter a) and shifted (using parameter b) to produce the wavelet functions (t).The impedance is defined as impedance = FT(voltage) / FT(current) in the Fourier domain, where FT denotes the Fourier transform. In this research, we use the wavelet domain to do comparable calculations and designate the findings as wavelet-impedance, using the formula wavelet-impedance = WT (voltage) / WT(current) The wavelet transform, whether DWT or CWT, is denoted[4] by WT. However, we continue to refer to "impedance" rather than "wavelet-impedance" throughout the study for clarity. At the transmitting end of three cables, normal cable, cable with holes, and shorted cable, voltage and current signals are measured. Five sets of data are collected for each wire. The complex wavelet analysis uses a total of 5000 samples from each data set. The parameter p is set to 4 for the complex Gaussian wavelet. The CWT has a scale range of 164 points.3-D time-scale graphs of the magnitude and phase derived from the estimated impedance for each cable. Most major peaks occur at small to medium scales, according to the magnitude distributions. Along the time axis, the phase distributions seem chaotic, but along the scale axis, certain patterns emerge. Each cable has its own magnitude and phase distributions, which may be investigated further to produce fingerprints.

2. DISCUSSION

Power cable is extensively utilized, particularly in the metropolitan power system, due to its benefits. To maintain a dependable power supply, it is critical to locate power distribution line faults quickly and precisely. Figure 2 discloses the Time-scale plot of the impedance phase, generated from data set 1 of the normal cable

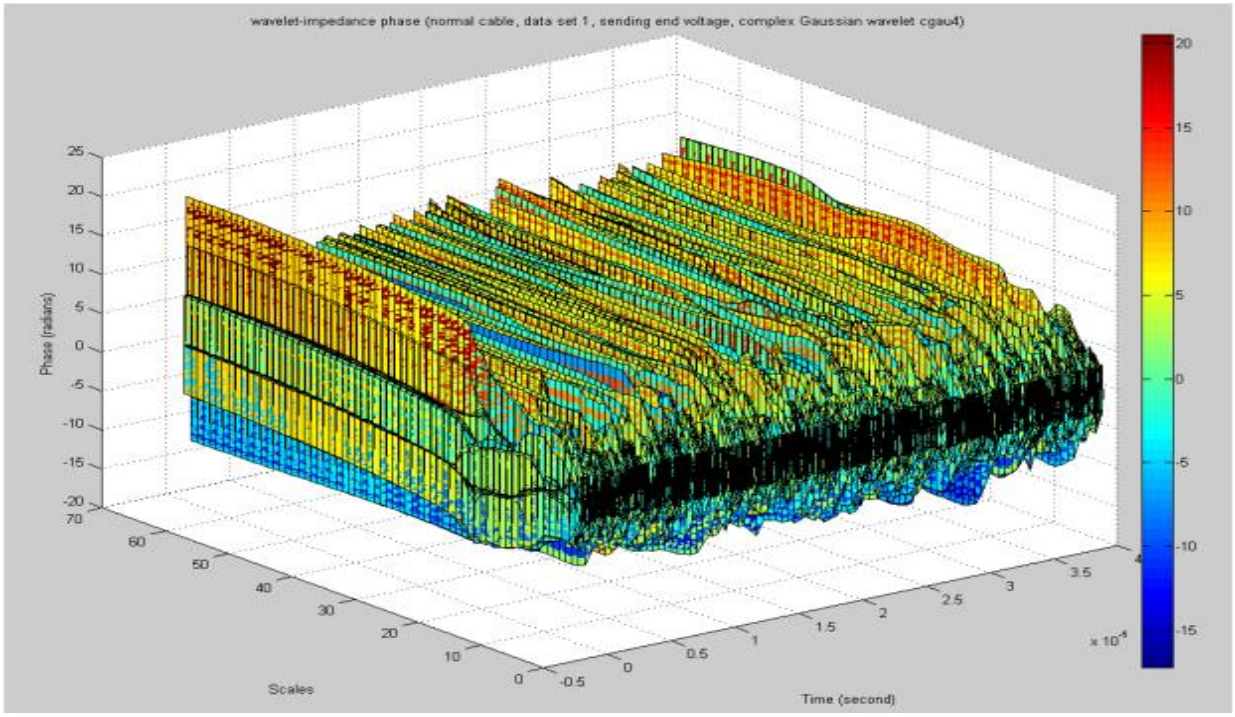

Figure 2: Time-scale plot of the impedance phase, generated from data set 1 of the normal cable[5]**.**

We must fmd find the problem spot and fix it after it has occurred. The first step is to see whether there is a problem, and then to figure out what sort of issue it is. On-line monitoring is primarily accomplished by tracking electric parameters and calculating insulation-related metrics in order to anticipate insulation damage. The purpose of this research is to provide a novel technique for monitoring cable problems and determining the kind of cable defects. The majority of urban electricity grids are tiny. Fault current is not a suitable way to fmd out a fault line when the power connection is damaged. However, measuring sheath grounding current may be a useful tool for detecting cable line faults. Previous grounding current research has mostly focused on steady state capacitance current. We analyze sheath grounding current in this article and provide a new technique of power cable fault monitoring in a 35kV power system that uses both steady state and transient capacity current..Sheth grounding mode and 35kV cable construction. Figure 3 discloses the Time-scale plot of the impedance magnitude, generated from data set 3 of the cable with holes.

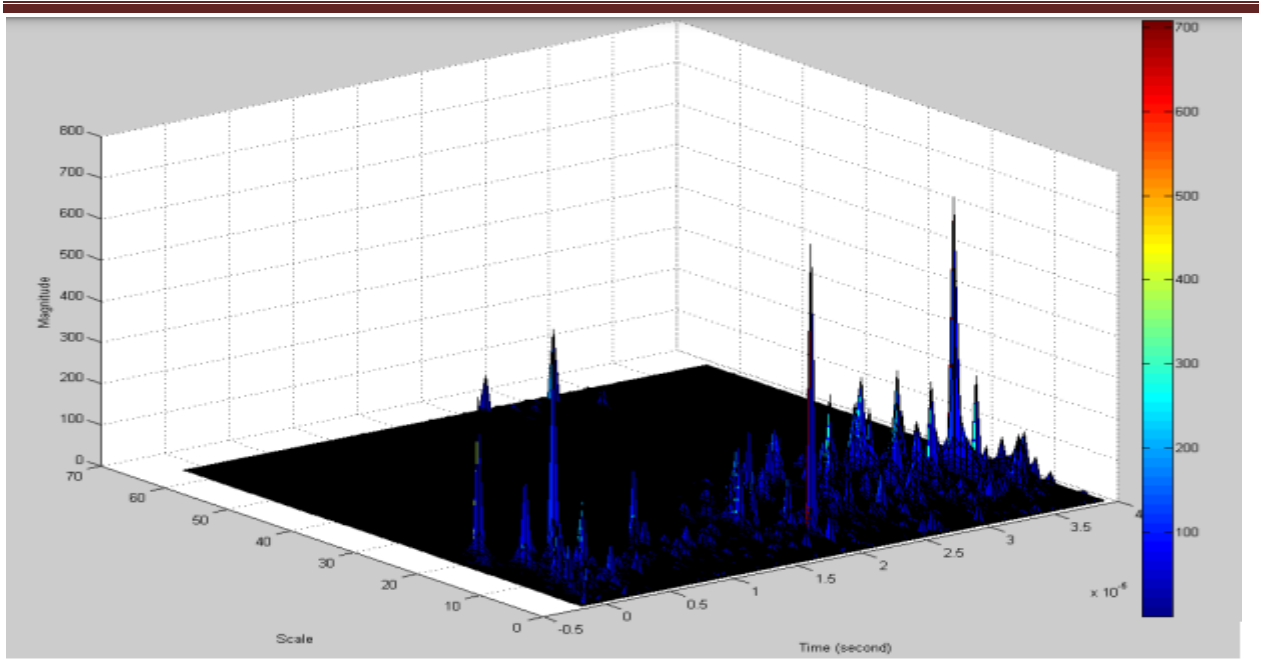

Figure 3: Time-Scale Plot Of The Impedance Magnitude, Generated From Data Set 3 Of The Cable With Holes[6]**.**

Conductor, insulation layer, copper shield, and Ann or layer is the four major components of. A simplified circuit is illustrated in Fig2 in the system where the neuter point does not ground. The metal sheath has one end that is grounded and the other end that is open. When alternating current passes through the cable core, an induced magnetic field forms surrounding it. It adds induced voltage to the equation. The circuit of the metal sheath is normally open. In the circuit, there is just capacitive current. The current flowing through sheath B. The power cable's steady-state fault characteristics The fault point is grounded when there is a circuit fault. Assume the grounding point is now in phase A.We know that phase A's voltage is zero. In phase A, the capacitive currents of the elements are zero. The total of capacitive 738 current in the other phase is the current through the fault site. In typical circumstances, the value is three times higher. In most systems, there are many lines. Other components' capacitive currents are included in the fault line current. Current in the shielding layer of the cable is interested in surrounding capacitance and line voltage level during normal operation. The following is the calculating technique for a capacitive current shielding layer: In the formulae, is the system's frequency[7]. The voltages in each phase are [7]referred to as Ui.In each phase, Ci stands for earth capacitance. Figure 4. Discloses the Time-scale plot of the impedance phase, generated from data set 3 of the cable with holes.

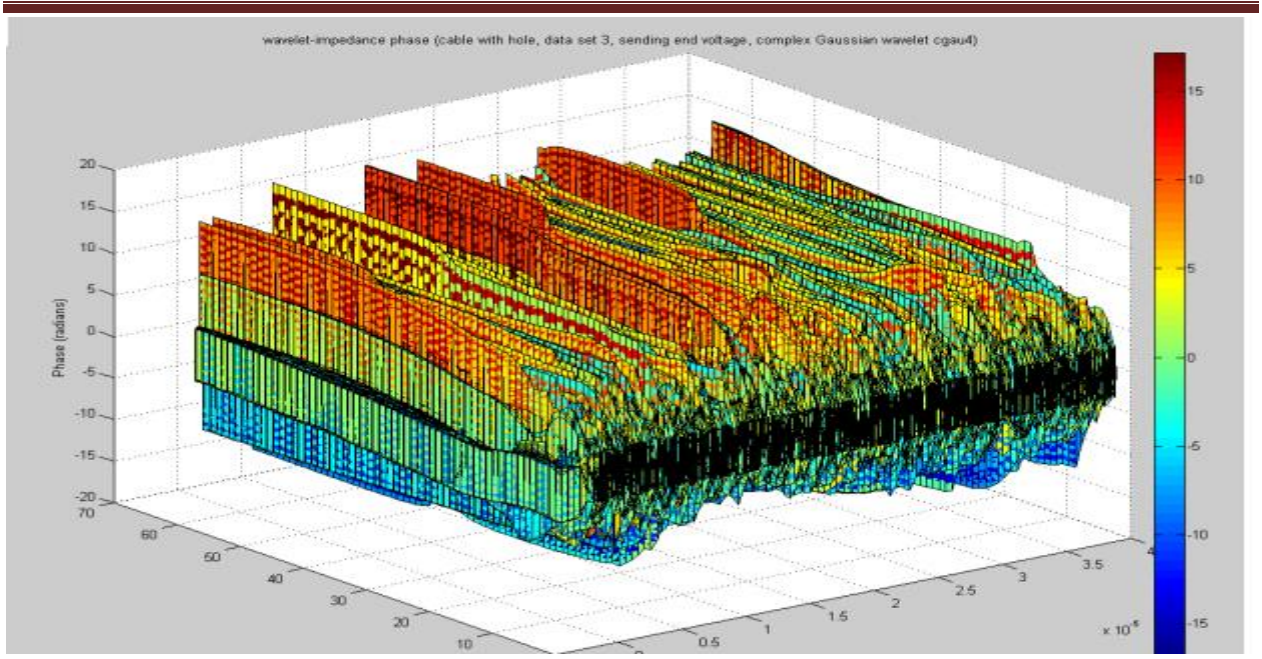

Figure 4: Time-Scale Plot Of The Impedance Phase, Generated From Data Set 3 Of The Cable With Holes[5]**.**

The cable's earth capacitance is: the dielectric constant in the formulae.The diameter of the conductor is 1 d.The outside diameter of the insulating layer is 2 d.To monitor the current in the cable's metal sheath, a current sensor is placed. The cable is made up of many sections. Each part's beginning is grounded.[8] The following are the openings at the conclusion of each part: Assume a fault occurred in the cable's first section. Before a grounding fault develops, current through the fault phase's sheath in the fault portion is equivalent to single-phase grounding capacitive current. When a grounding fault develops, it is three times larger than before. When there are several lines, the capacitive current in other phases is added to the current via the fault site. The current flowing through the sheath of the sound phase in the fault portion was three times greater than before. As a result of a voltage change. In the non-fault portion, current through the sheath is almost nil. Due to the fact that the voltage is zero. By comparing the differences in currents through the sheath of each phase in each part, we can determine which part and which phase is grounded. Obviously, the portion whose current through the sheath rises is grounded. The transient capacitive current is divided into two components after a grounding failure. Because the voltage is dropping, the discharge capacitance current of the grounded phase is increasing. The current has a high frequency and a rapid attenuation due to the voltage rising. Charging capacitance current of sound phase. The current is slower to attenuate and has a lower frequency.The amplitude of phase voltage is denoted by Um.The capacitive current's amplitude is measured in cm I. The angular frequency is 0 degrees.is the transient free oscillation component's attenuation coefficient. This is the first stage.is the angular frequency of the power frequency. The steady-state component is opposite the transient free oscillation component.The transient free oscillation component has the same polarity as the steady-state component at the start of the transient. Fault features are readily apparent[9].

3. CONCLUSION

We used complicated wavelet analysis to create a method for cable diagnostics in this study. It combines CWT and complex wavelets to compute impedance in the wavelet domain for analysis. The recovered magnitude and phase signatures have been confirmed to be useful for differentiating between different kinds of cables via tests using data collected from various cables. A technique based on sheath grounding current is given in this article to address the issue

of fault monitoring in cable lines. The fault phase and sound phase sheath grounding currents have distinct properties, according to the study. We can determine which component and phase is at issue based on these discrepancies. However, when fault resistance rises, the features of a grounding defect become less noticeable. When fault resistance is strong, it is difficult to determine the fault line[10].

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IDEOLOGICAL AND ARTISTIC SEARCHES IN THE SHORT STORIES OF THE ARAB COUNTRIES OF THE PERSIAN GULF AT THE BEGINNING OF THE XXI CENTURY

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ABSTRACT

This article explores the ideological and aesthetic transformation of the stories of the Persian Gulf at the beginning of the XXI century, the appearance of miniature and very short stories in the Arab story. At the turn of the 21st century, great changes and shifts have occurred in Gulf novelism, and these have occurred mainly in the traditional plot, which is an important element of the artistic form. The interconnected situations, the sequence of events have practically changed, the stories have acquired a more lyrical character, and the development of thoughts, feelings, emotions and experiences has intensified in them.

KEYWORDS: *Thoughts, Feelings, Emotions, KhudaNaimi, Qatar, Holy Quran, Bukhturi, Kuwait, United Arabic Emirates, Psychologism, Novelistics, Persian Gulf.*

INTRODUCTION

At the turn of the 21st century, great changes and shifts have occurred in Gulf novelism, and these have occurred mainly in the traditional plot, which is an important element of the artistic form. The interconnected situations, the sequence of events have practically changed, the stories have acquired a more lyrical character, and the development of thoughts, feelings, emotions and experiences has intensified in them.

THE MAIN FINDINGS AND RESULTS

Arab literary scholars call the external (traditional) movement of the plot - "at-tabir al-khorijiy" (**التبئير الخارجى**) and the internal movement "at-tabir ad-dakhiliy" (**التبئير الداخلى**). [1:68]

Qatari writer KhudaNaimi applied external plot movement (at-tabir ad-Dakhiliy) in her short stories "*At the Bottom"* (فى الحفرة), *"A Stain on the Wall of History"*(شخبطة على جدار التاريخ), *"Leila and I"* (ليلى و أنا), "*Acrobats*" (اكروباتا), "*Done for others*" (يحدث للاخرين).

In the story of the writer "*At the Bottom*" [2:13], the main character seems to fall into a deep hole. No one can save him or even try to save him.

In this story, the writer abandons the chronicle approach to plot organization and puts the effect before the cause. In a monologue addressed to the relatives of the protagonist of the novel, he

compares them with the people from the cave, mentioned in the surah al-Kahf of the Holy Quran, who have lagged behind their time, and pours out "curses" on their heads. Another feature of the work is that the situation in it requires a creative approach from the reader, the writer creates for the reader a state of seeking a solution along with the main character, she observes, analyzes events, and seeks a way out. But mainly because of the spiritual pit created by the protagonist himself, accustomed to slavish obedience, who never rebelled, he cannot find the strength and will to get out of this pit.

The story of the writer from Bahrain Fawziya Rashid "*Swimming*" (سباحة) [3: 7: 4] masterfully covers the story of overcoming the crisis between a man and a woman. In the story, the writer uses various methods to realize her creative intention: firstly, an ironic, satirical style: the main characters do not get tired of arguing with each other, even when they are drowning in the sea, the second sign is that the true image of the heroes manifests itself in a "borderline" situation characteristic existentialist literature, that is, in the struggle for the lives of drowning people. Disagreements arise when two strong personalities collide. A man was fascinated by a freedom-loving woman, but when the same traits of a woman became a burden to him, and he tried to put himself in the place of the "master" in family relationships, the woman's whole being rebelled against this, she could not get used to such a relationship. In the story, there is a new approach to the problem of women. This new approach appeared only in the late XX - early XXI centuries, mainly in the works of female writers. The main character in them is usually an enlightened, highly educated, self-aware, self-confident, equal to a man, sometimes superior to him, a woman of this category - the main character in Fawzia Rashid's story "*Swimming*". As a result of a constant quarrel between a man and a woman, they decide to divorce. The writer puts the heroes in a critical situation when they can drown. In danger, they unite, fight for life, support each other and survive. These dangerous moments cleanse them, as if they are being reborn with the universe. Before death, all their whims, ambitions will seem petty, futile and unnecessary.

The works of Sultan Amimi, a novelist from the United Arab Emirates, are written in various forms and styles, and in content most of them relate to rural life, which sets him apart from other writers. His stories "*The Long Guts*" *(السنطوانة)*, *"The Graves*" *(قبور)*, "*The Oath*" *(ثأر)* [4] portray rural landscapes, customs, lifestyles and attitudes with great skill. The presence of local colorful touches and national traditions gives a special charm to the writer's stories. Despite the socio-economic changes, it cannot be said that the villages of the emirates have completely abandoned the tribal structure. Among the population, there are still old rituals, interpretation of dreams, belief in magic, seeking salvation from witchcraft with the help of various rituals, and observance of customs. The writer laughs at these local heresies, and this mood permeates his stories. But sometimes adhering to old habits and customs takes a serious turn.

Especially if one of the tribesmen is killed, the obligatory blood feud has not lost its significance in the villages. The main character of the stories "The Oath" *(ثأر)* Khadiri lived for twenty years with a desire to take revenge on Bukhturi, the murderer of his father. He got married, he already had children, but the heavy burden that was placed on him did not leave him alone. He didn't want to kill a man. Bukhturi, who committed that murder quite by accident, always lived in fear, and tired of waiting for his end, he took the shroud in his hands and came to Khadiri to ask for a petition. He drove 20 camels, which he collected all his life, came with a large amount of money, surrendered to Khadiri and expressed his bitter regrets. They agreed, the owner slaughters the sheep.

For centuries, the society was ruled by the motto "blood for blood, eye for an eye". But the consciousness of the villagers is also changing. And the sensitive heart of the writer caught this change and he embodied it in his work. In addition to rural life, the author is interested in family relations in the Emirates ("*Soul*"*قلب* , "*Letters*" *رسالة*), family and life problems of Emirati men

married to Western women who have a different mentality (“*Door number 4 to call*” (4البوابة رقم)), unfair trial (“*Choice*”الاختيار), social indifference (“*Red*” حبر أحمر).

Some of the stories are written in the classic realistic style, that is, they are close to lifestyles, and some are written in the form of letters or are written by telegraph. The author makes extensive use of the stream of consciousness in psychoanalysis “*Waiting room*” (غرفة انتظار), *“Remember, my friend*” (للذكرى يا صديقي). Very short stories, that is, miniatures, occupy a large place in the work of Sultan Amimi.

By the beginning of the 21st century, three main types or types of story can be distinguished in the novelistics of the Arab countries of the Persian Gulf. In Arabic literary criticism, they are called: “issatuntawilatun” –**قصة طويلة**(long story), “issatunkasiratun” - **قصة قصيرة** (short story) and “issatunkasiratunyiddan” - –**قصة قصيرة جدا** (very short story). Very short stories are also found in other national literatures, for example, in Iranian literature they are called “dastanak”, in English literature – “drabble”, in Japanese literature – “syo: to - syo”: to”, and in Arabic literature “al-kissaqasiratunjiddan”. In the Persian Gulf at the beginning of the 21st century, Suraya Baksami (Kuwait), Sultan Amimi (United Arab Emirates) and Nasrin Abdullah Kaffa (Qatar) became famous for such very short stories.

SurayyaBaksami's very short stories are often one-page memoirs, and their order is not consistent in time and space. Based on the subject matter, these miniatures are divided by the author into categories such as “Sidewalk” ***(ارضفة)***, “Loyalty” ***(صداقة)***, “Roads” ***(مسارات)***, “Childhood” ***(طفولة)***, and “Pages” ***(أسفار)***.

By the 21st century, the volume of stories in the genre of "very short", which received significant development in the literature of the Persian Gulf, became even more compact: from 25-30 lines to even 5-6 lines. In Uzbek literature, the terms “mitti” are usually used for such stories.

The very short stories of Sultan Amimi mainly consist of 5-6 lines, less often there are stories of 7-8-9 lines. Most of his stories are written in the form of dialogues and reflect the attitude of lovers. In these 5-6 lines, the relationship between a young man and a young woman goes through various life experiences and trials in a short and concise form and, finally, has its own positive or negative result, allowing you to make an appropriate conclusion.

As usual, the names of the characters are not indicated. In many cases, the story begins with the verb “he said” or “she said” (**قال** masculine, **قالت** feminine). An example is the story “*Letter*” (**رسالة**):

رسالة

قالت أحب أن ترسل إلي رسالة بريدية. تحولت الى رسالة ، و نمت فى صندوق بريدها لأيام وحيدا.

ثم انتشلتني ذات صباح و قالت : نسيت أن أحبرك أني من هواة جمع الطوابع!

نزعت الطابع ، و طوحت بالرسالة بعيدا!

Letter

She (the girl) said: “I want you to send me a letter through the mail”.

I turned (with my whole being) into a letter, spending the night alone in her mailbox for several days. One morning she said to me: “I forgot to tell you that I am one of those who collect stamps!”

Then she tore the stamp off the letter and threw the letter away! [4:35]Letter

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I turned (with my whole being) into a letter, spending the night alone in her mailbox for several days. One morning she said to me: “I forgot to tell you that I am one of those who collect stamps!”

Then she tore the stamp off the letter and threw the letter away! [4:35]

This miniature story is a reflection of a bitter life experience, because the love of a young man met with indifference, indifference. The writer succinctly and expressively talks about strong love: the young man with his whole being turns into a letter. The answer was unexpected not only for him, but also for the reader, and created a situation for reflection.

Sultan Amimi's 5-6 line stories are certainly very different from the one-page stories of Suraya Baksami and NasrinKaffa. As the text narrows, the density of the content increases. The reader needs to strain his mind to comprehend the text. Sometimes the story is not fully revealed; it seems incomplete and requires a creative approach and conclusion from the reader. The instructive tone of the text can completely disappear and sometimes there is no open conclusion. There is a distortion of reality, inconsistency with reality; the layers of time can also shift.

Symbols and subtext distinguish them from the usual descriptive narrative speech and writing style based on traditional social realistic conflicts. For example, in the 6-line story “*Truth*” (**حقيقة**), we see the following picture:

حقيقة

انتشرت إشاعة قوية بأن عرافا يضضح الكذابين سيزور قريتنا يوم الاثنين...

و في صباح الاثنين...

خلت الأسواق ودور العبادة و المرافق الحكومية من الناس تماما...

و كان الأطفال يلهون و حدهم في القرية

True

The news of the fortune teller's arrival in our village on Monday, who exposes the liars, spread quickly...

Monday morning…

Markets, temples, government offices are completely empty...

In the village only children played merrily. [4:27]

Although the text is very short, it contains a poignant social critical eye.

There was not a single honest person left in the entire village, not only in the bazaar, in government offices, but also in churches, lies, intrigues and hypocrisy flourished. The miniature story has its own plot: the plot is the news of the fortune teller's arrival, the escape of people is the culmination of the story, the fact that the children were left alone in the village is the denouement.

In this article, we have investigated the changes in the novelistics of the Gulf countries at the end of the 20th and the beginning of the 21st centuries, such as the expansion of the range of topics and the emphasis on psychologism. In an artistic depiction of the reality of life, the writers of the Persian Gulf resort to various creative techniques, in their stories, along with scenes reflecting endless changes in the inner emotional world of a person, the vain attempts of a lonely hero to rise from the "depths" of a chaotic world (this style is characteristic of modernism), got the place of a page with realistic paintings that seek to faithfully portray life.

CONCLUSION

To conclude, we can say that the modernist principles of existentialism in the works of the studied authors form an artistic mixture with an excessive sensitivity of sentimentalism, with an open expression of the enlightenment concept of man, with an ironic approach and signs of intertextuality characteristic of postmodernism. To realize their creative ideas, writers widely use various methods, expressive and pictorial possibilities, word games and other techniques in their short stories when covering socio-political, educational, spiritual, moral and educational issues.

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COMPOSITION AND PROPERTIES OF SPECIAL SOLUTIONS

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ABSTRACT

The article presents the optimal compositions and properties of backfill mixtures using waste rock sand, marble processing waste and copper smelting slag. The desire to increase the extraction of minerals from the subsoil, the creation of more favorable conditions for the separate extraction of multi-grade ores and the safety of underground mining predetermined the wide development of the development of deposits by systems with solidifying backfill of the mined-out space.

KEYWORDS: *Backfill Mixture, Optimal Compositions, Copper Smelting Slags, Marble Processing Waste, Additive, Waste Rock Sand.*

INTRODUCTION

The desire to increase the extraction of minerals from the subsoil, the creation of more favorable conditions for the separate extraction of multi-grade ores and the safety of underground mining predetermined the wide development of the development of deposits by systems with solidifying backfill of the mined-out space [1, 2, 3, 4 and 5].

In this regard, scientists and material scientists are conducting research to improve the quality of the product and reduce the cost of using local raw materials and various industrial wastes in the production of filling mixtures to fill the mined-out area. Analysis of domestic and foreign literature has shown that in recent years, a new leap has taken place at ore mining facilities with

backfill technologies. There is a tendency of increasing use for the preparation of hardening backfill as a binder and fillers of various wastes and by-products of the industry, primarily mining, fuel and energy and chemical.

The use of waste is beneficial from both economic and social points of view. Thus, compared with the use of natural raw materials, the costs of exploration, construction and operation of quarries are excluded, the costs of fuel, energy and transport are significantly reduced, the cost of mined ore and finished products is reduced, the land occupied for dumps is reduced, the raw material base of the building materials industry is expanding. , as well as the issues of environmental protection from pollution [6, 7, 13, 14].

Waste is generated in the production activities of the Almalyk Mining and Metallurgical Combine, which must be disposed of and create special dumps for storage.

Long-term scientific and technical cooperation of the AMMC with the Tashkent Institute of Architecture and Construction in solving the issue of rational use of the plant's waste and their use in filling mixtures for two decades has made it possible to significantly advance in solving this problem.

Earlier, for the plant, the compositions of filling mixtures were developed using fly ash from the Angren State District Power Plant, waste from the marble quarry "Kora-Khona", as well as mixtures based on a slag-alkaline binder, for which a patent of the Republic of Uzbekistan was obtained and regulatory documents were prepared [8, 9 and 10].

MATERIALANDMETHODS:

At present, in connection with the completion of the marble quarry, problems have arisen to provide the combine with raw materials for the preparation of filling mixtures. To develop new optimal compositions of filling mixtures, the following types of waste generated at the plant itself were selected and studied:

- Waste rock sand obtained at the crushing plant at the Kauldy mine after the extraction of minerals.The limiting sand size is 5 mm;

- Marble processing waste generated from the activities of the marble workshop of the combine.This additive is used as a plasticizer and reduces the abrasive properties of waste rock sand;

- Slags of copper-smelting production, in the form of finely ground powder. Of the variety of metallurgical slags, copper-smelting and nickel slags are of no less interest for construction and the production of building materials.The general view of copper smelting waste is shown in Figure 1.

Figure 1. General view of copper smelter waste

It should be noted that the above wastes do not require additional technological processing and are used in their natural form.

RESULTS:

The development of optimal compositions of filling mixtures was carried out using a mathematical method of planning an experiment, verified by a computational and experimental method, with further refinement in the manufacture of test mixes in laboratory conditions with testing the actual rheological and physical and mechanical characteristics of filling mixtures and solidified samples.

The test methodology for samples-cubes of filling mixtures based on waste with face sizes of 7 and 10 cm corresponded to the requirements of regulatory documents for conventional mortars. The test period for thecube samples was 28 days.

Waste of a marble quarry after processing on the classifier had a granulometric composition presented in table 1. The same table shows the grain size composition of rock sand.

TABLE 1 GRANULOMETRIC COMPOSITION OF WASTE FROM A MARBLE QUARRY AND ROCK SAND

Name	Private balanceson sieves,%						Passed through a sieve 0.14	The amount of clay and dust particles	Size module
	5	2,5	1,25	0,65	0,315	0,14			
Waste from a marble quarry	0,15	15	15	25	16,5	18,5	9,5	07-09	1,7-1,9
Mountain sand	1,5	12,0	9,0	19,5	15,5	14,0	28,5	1,5	1,0-1,2

DISCUSSION:

The results of the tests carried out for filling mixtures using waste rock sand, marble processing waste and copper smelting slags are shown in Tables 2 and 3.

TABLE 2 OPTIMAL COMPOSITION OF FILLING MIXTURES USING WASTE ROCK SAND FOR THE KAULDY MINE

Train numbers	Amount of materials per 1 m3 of mixture, kg			Mixture mobility, cm	Average compressive strength, MPa
	Portland cement grade 400	Wasteland sand 5mm or less	Water		
I	100	1400	280	14-16	2,5
II	150	1400	280	14-16	4,0
III	200	1400	280	14-16	8,8
IV	250	1400	280	14-16	9,7
V	300	1400	280	14-16	13,5

When developing the technology for laying filling mixtures into the goaf, two schemes for the construction of artificial massifs were selected and tested:
- Erection of artificial arrays using a homogeneous filling with a multi-strength (two-three-layer) filling mixture;
- Erection of artificial massifs using a combined (rock-hardening) bookmark.

TABLE-3 OPTIMAL COMPOSITIONS OF FILLING MIXTURES USING SLAGS FROM COPPER SMELTING PRODUCTION AND SAND OF WASTE ROCK

omponents	Initial materials for 1 m^3 of mixture, kg			
	Compositions:			
Portland cement	250	200	150	120
Copper smelting slag	0	30	60	90
Sand of empty rock	1400	1400	1400	1400
Water	280	280	280	280
Average compressive strength, MPa (28 days)	12,6	12,1	11,4	9,2
Average bending strength, MPa (28 days)	2,24	2,1	1,9	1,6

CONCLUSION

The essence of the technology for the construction of a multi-strength filling array is as follows. In the treatment chambers (the shaft of the mine), the lower part is initially laid to a height of 1.5 - 3.0 m with the composition of the filling mixture, which ensures the standard strength of up to 1.0 MPa, in the last turn (the third layer), the upper layer is initially laid at a height of at least 0, 5 m composition, providing standard strength 3-4.5 MPa. On average, the porosity of the filling mixtures is 18-21%. The density of the hardening fill was determined by weighing cubic standard specimens with face dimensions of 7 and 10 cm. It ranged from 1750 kg / m3 to 1830 kg / m3 [8, 11 and 12].

Analysis of the data obtained allows us to draw conclusions about the advisability of further research and use of the plant's waste for filling mixtures, since this expands the range of waste used, reduces the cost of mined ore and finished products, increases the strength indicators of filling mixtures, and also improves the environmental situation in the region by eliminating dumps.

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KHOQAND MERCHANTS AS MEDIATORS IN INTERNATIONAL TRADE BETWEEN THE QING EMPIRE AND CENTRAL ASIAN KHANATES

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ABSTRACT

In the 18th century with becoming the Khoqand Khanate as an independent state developed external and internal trade in Central Asia, being one of the important component of social-economical life of the country. New bazaars, shopping malls and caravanserais were built and existed ones were restored. In the 18th – 19th centuries the Khoqand Khanate led active trade relations with China. China exported tea, silk fabric, silver, ceramic products, herbal medicine and musk. In addition, it should be noticed that Khoqand Merchants played a vital role in developing close international trade relations. One of several key factors that contributed to these relations was being a provider (hub) in trade relations between China and other Central Asian countries, like the Bukharan and Khivan Khanates, as well as Afghanistan. Moreover the Khoqand Khanate used to provide with Chinese goods not only Central Asian countries, but also becoming international transit and trade zone for the Ottoman Empire, which allowed the Khanate to get economically sufficient profit from customs services. In order to set up tied diplomatic relations the Rulers of the Khoqand Khanate sent as presents different Chinese products, which were given by Kokand merchants, to Russia and The Ottomans and confirmed by data of archival documents.Dynamic of the activity of the Khoqand merchants and their role in trade relations between China and Central Asian countries have been reviewed.

KEYWORDS: *Khoqand merchants, Khoqand Khanate, China, Central Asian countries, trade relations.*

INTRODUCTION

The main purpose of my presentation is to highlight the intermediary role in trade relations that Khoqand tradersplayed between China and other Central Asian states, such as the Bukhara and Khiva khanates, Afghanistan.

Khoqand is an ancient city in the Ferghana Valley. At the beginning of the 18th century, it was the capital of a state that emerged as an independent state in Central Asia. The name of the state

is also named after that city. It is the Khoqand khanate, one of the Central Asian khanates that existed from 1709 till 1876. Khoqand is an ancient trade town. Information about this city is found in the geographical works of Arab authors of the 10th century. In particular, in the work of Mukhtar al-Istahri in "Kitab al-Masalik" and in "Hudud al-olam" (written in 983) about the city of Khoqand. This proves that Arab scholars had deep knowledge of Central Asia and Movarounnahr. In the following years, in the 18th and 19th centuries Khoqand traders became more active in international trade. One of the reasons is that Khoqand's location at the crossroads of trade.

In the 18th and 19th centuries Khoqand played a significant role in the socio-economic life of the country as a result of its becoming a major city and capital of the state. This, in turn, gave impetus to the development of domestic and foreign trade. As a result, new markets, trading centers, caravanserais were built and existing ones repaired. This led to the development of both domestic and foreign trade in the country's markets.The trade relations between China and other regions of Central Asia in the 19th century indicate that the Khoqand traders were active. This can be seen from sources and archives. Also, a number of articles and books on trade relations between China and Central Asia have been written by historians such as T. Saguchi, M. Kutlukov L. Nyubi, Sh. Qo'ldoshev[1]. However, these studies do not highlight the mediation of Khoqand traders in China and Central Asia. Or there was no such approach. By the 19th century, the Khoqand khanate had an international position and status. The city of Khoqand became an important transit city. As a result, Khoqand traders became more active in international trade, supplying Chinese goods to Central Asia. Moreover, Khoqand traders took the leading positions in mutual trade between China, Russia, Bukhara, Khiva, Afghanistan and India. Let me stop to the facts.The description given to Khoqand traders by Chinese historians. “The people of Khoqand were very good at trade”.

In the 18th and 19th centuries, the largest international trade centers in Central Asia were Khoqand, Samarkand and Bukhara. The main trade products from China to Central Asia were tea, raw silk and silk fabrics, porcelain, paper, silver bullion, musk, rhubarb and other products. These Chinese products were in great demand in Central Asian countries.The Russian military officer Velyaminov-Zernov, who was in Khoqand in the 1850s, wrote in his travel report that the Khoqand traders brought Chinese tea, porcelain, and silk fabrics to Bukhara market.

SALE OF TEA

The fact that Khoqand traders brought Chinese tea to the markets of Central Asia is also reflected in the studies of Japanese scientist Toru Saguchi and Uzbek scientist Sh. Qo'ldoshev.

Chinese tea was brought by Khoqand traders from the Inner China and Xinjiang markets. Khoqand traders acted as translators at that trade.

The tea species cultivated in Chinese Tebey, Yunan, An-Xou and other regions were brought to Khoqand Khanate.

The varieties of tea brought to Bukhara by the Khoqand traders were called *“To'qtachoy”* and *“Oqquyruq”.* These were green tea. According to *"Turkestanskie sborniki"*, the Chinese tea came from plantations along the Yantszi River.

According to the Chinese sources of Toru Saguchi "the annual trade turnover between Khoqand and China ranged from 100,000 to 300,000[2]*chings*"[3]. In the middle of the 19th century, the annual trade turnover of Khoqand with only one Kashgar amounted to 5 million rubles and the amount of tea to be brought to Khoqand amounted up to 30,000[4]*poods*[5].These figures were enormous for the 19th century.

Khoqand traders spread tea products from the Khanate to the Russian empire, Bukhara and Khiva khanates.

Like other Central Asian rulers, Khoqand rulers, who were active in international trade, had been profiting from selling tea from China to countries in the West.

The historian from Khoqand Tojir Khodjandi, in his work *"G'aroyibi sipoh"* left information about the features of Chinese tea[6].

A chronicler MuhammadAziz Margilani had mentioned in the *"TarikhiAziziy"* the fact that a large amount of tea was kept in the treasury of the khan[7]. Demand for tea was also mentioned in agreements between the Khoqand rulers and the Manchu government. This information even indicates that the Khoqand ruler Muhammad Ali Khan paid particular attention to international trade, especially in his control of tea sales. Some sources on the history of the Khoqand Khanate also include information about the types of Chinese tea. The widespread use of Chinese tea in Central Asia is said to have influenced the emergence of a "tea culture" for the region's population. In the 18th and 19th centuries, the *Choyxona*(Teahouse) was widespread in the Ferghana Valley, not only in cities but even in villages and small neighborhoods. Sources note that there were many *Choyxona*(Teahouse) in the markets. The *Choyxona*(Teahouse) was a place where men could sit and talk. There is such tradition today. But there is a difference between the "Teahouse" that existed 30-40 years ago. Unfortunately, this Uzbek tradition is currently undergoing transformation. It is not preserved as in the old tradition.Even 19th-century European tourists in Central Asia have left plenty of information about the culture of the Teahouse. In particular, the English Officer A. Burns describes the types of tea in the markets and the methods of its preparation. He also notes that "the day begins with tea". This is a very interesting description.

In the late Middle Ages, tea was an important trade pproduct in trade relations between Central Asia and China. Although Chinese tea had become a large consumer product among the population of this region, Khoqand tea traders also acted as translators in the trade relations between the West and the East.

SILK FABRIC TRADE

Khoqand traders sent only 1,000 camels of silk a year to Bukhara alone. It is estimated that it amounts to 12,000 poods. It is also noted that in 1860 the price of one pound of silk was equal to 22 Khoqand gold coins and 197 rubles in Russian currency. In fact, silk was cultivated in Khoqand and the entire Fergana Valley. However, the demand in the Central Asian markets could not meet the demand for silk produced in the Khoqand khanate. Therefore, much of this demand came from China. According to the data of 1870 one poodle of Kashgar silk of the first sort, brought for Bukhara by the Khoqand traders and was sold for 22 gold in Khoqand but sold in Bukhara for 20 gold. Here I must notice that at that time Bukhara's gold was rated higher than Khoqand's gold.

Chinese Paper Trade

Paper production in Central Asia was mainly concentrated in Samarkand and Khoqand. That is why Khoqand and Samarkand paper became popular. However, it was also known that Chinese paper was sold in Central Asian markets in the 19th century. Khoqand traders brought to Bukhara markets Khoqand paper "*Ishtarhoniy"* sort. In addition, a large amount of paper *"Abreshim"* was imported from China through Khoqand. L. Rempel noticed this in his study of Bukhara art and crafts. Due to the fact that paper was not produced in Bukhara, government documents, diplomatic letters, and books were written on Khoqand paper.

Silver Trade

Silver was imported from China to Central Asia. Almost all researchers mention this. According to the Russian travel documents the Khoqand khanate, the Bukhara and Khiva khanates didn't have silver therefore it was fully imported from Kashghar.

Chinese Products In Diplomatic Relations

The archival documents confirm that the Khoqand khans sent Russian goods to the rulers of the Ottoman Empire as a gift from the Chinese goods brought by the Khoqand merchants. As I studied the history of the Khoqand Khanate's diplomatic relations with the Ottoman Empire, the information in the documents caught my attention. Ambassadors sent from Khoqand to Istanbul accompanied with presents from the Khoqand ruler. This document is stored in the Hattie Humoyun (HAT) fund of the Ottoman Archives in Istanbul under the number 657/32100 D. This document was the second embassy sent by Muhammad Ali Khan in 1254/1838, led by Muhammad Zahid Khoja. It is revealed that part of the gifts presented in this document were Chinese goods.

According to documents from the National Archives of Uzbekistan, Chinese goods were transported through the Khoqand traders to the Ottoman Empire. The goods transported to the Ottomans were mainly Chinese tea and porcelain. In addition, Khoqand traders played an important role in Afghanistan's trade relations with China and Kashgar. Chinese goods were transported to Afghanistan via Bukhara. Chinese porcelain in Afghanistan “famous for Kashgar porcelain.” Russian traveler Yavorsky wrote in his writings. Khoqand had been actively pursuing diplomatic relations with China. According to the historian Kutlukov, this is based on information from Chinese historians. He writes that in 1809 the Chinese emperor Yun Yan completely abolished customs duties on Khoqand goods in China. This was a great privilege for the Khoqand traders.

CONCLUSION

As a result, Khoqand traders played a major role in the international trade of Central Asia with China. This, in turn, was an important factor for Khoqand traders' role in the Central Asian market.These facts in history show the importance of China's relationship with the Muslim world.

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BULLYING AND CYBERBULLYING DESCRIPTIONS

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ABSTRACT

Bullying has developed as a habit having harmful consequences on young people; nevertheless, prevalence assessments differ depending on measuring methods. In order to get a better understanding of each approach, we carried out a systematic study and content analysis of bullying measures, including behavioral contents. Multiple internet resources have been examined for measures released between 1985 and 2012. Measuring methods included assessing the behaviour of bullying, were given to respondents aged 12 to 20 years, were delivered in English, and psychometric data were provided.In this chapter, we examine the concept of bullying and the related term of cyberbullying. We start by analyzing the word bullying and the defining characteristics usually associated with it, namely purpose (to hurt), repetition, and imbalance of power. We also examine the related notion of harassment. We then go on to the word cyberbullying and a related term cyber aggression. This includes a debate of how helpful the conventional bullying criteria are in the internet realm. We conclude with some suggestions about the meaning and usage of the term 'cyberbullying'.

KEYWORDS: *Aggression, Bullying, Cyberbullying, Victim, Violence.*

1. INTRODUCTION

Aggression is usually considered to be a deliberate behaviour in psychological literature that harms anybody (or some living creature) that doesn't want to be hurt. The 'someone' is typically someone else, even if some individuals do themselves damage, of course. The conduct should be deliberate since unintentional damage is not seen as hostile. For many decades, the aggressiveness literature concentrated on the direct and individual kind of aggression such as direct physical assaults such as striking, kicking, punching and direct verbal attacks, such as threats, bullying and insults.In the early 1990s, however, the emphasis was extended to other types of violence. Researchers have developed the notion of indirect violence, which is directed at someone but not personally committed. It is typically done via a third party, which spreads unpleasant stories about someone, for example. Indirect attacks may also include incident when a purposeful detrimental act was perpetrated, but the assault did not occur; it is often done to hide,

steal or damage property of someone while the victim is not there, and physical bullying can be regarded indirectly[1].

Researchers suggested the term relational aggression as an aggressive conduct designed to harm connections between people. This also involves the propagation of rumours and social isolation. Although relationship aggression is frequently indirect (e.g. spreading rumours aimed at one's relationships and reputation; never selecting a partner to work or to play, never talking to him or her), this may be blatant, face to face. Researchers used the same term social aggression, which refers to violence to harm the self-esteem or social standing of others. Some research indicates that the pain of relational violence may have a greater effect than that caused by physical assault.In addition to the obvious blows and insults researched in the past decades, it is now widely recognised that aggressiveness should take indirect and relational forms. Aggression may occur in the workplace in particular in adulthood, including more advanced ways, such as when someone sets completely unreasonable objectives and undermines the confidence and pleasure of others. And cyber aggression in this century encompasses mobile and internet assaults.

1.1 Bullying Definition:

While no generally accepted definition exists, there is growing agreement in the Western research tradition that bullying refers to repeated hostile actions against a particular target (the victim), who cannot readily defend themselves. A related definition is that bullying is "systematically misuse of authority," but with wider implications. In the majority of study material, bullying is therefore regarded as:

I. an act of aggression;

II. perpetuated via any kind of violence (e.g., physical, verbal, cyber; direct or indirect);

III. there is a power imbalance between the offender and the target (the victim finds it hard to defend him/her);

IV. It has some repeating element (these things can happen frequently).

Although the two criteria of power imbalance and repeatability are not recognised universally, they are now extensively utilised. The relative defencelessness of the victim in particular means that others are obliged to act. Researchers claimed that the freedom not to be intimidated is a basic democratic right. The growing worldwide concern about the use of bullying by schools in the last 25 years seems to mirror a growing concern for human rights problems that developed and continues to develop during the 20th century[2].

Bullying may occur in various settings, including in the business, the family, the military, and prisons. Themes like bullying in the workplace are really increasing in study fields. The main emphasis of bullying research to far has nonetheless been on in-school bullying. In schools, we may think about teacher-teachers, teachers-pupils, pupil-teachers and bullying, even if the latter has always been the main topic of attention.

1.2 Bullying in Many Languages:

Bullying is essentially an English or northern word in Europe. Words for bullying vary in various languages and have not precisely the same significance. Latin languages in Europe lack a word like bullying, although they have numerous names for aggressiveness and violence; yet the English term bullying appears easily understood. The word ilbullismo was introduced to the language in Italy. Harassment, which is more typical of direct and persistent violence, is the closest phrase in Spain, while maltratoporabuso de poder is used as an idiom in general; in addition to the word bullying, the word bullying is now occasionally sometimes used.

The word closest to bullying in Japan is ijime. This is more on group dynamics and the position of the victim in the social network, with more focus on social exclusion, like the Korean Wang Ta word. These variations seem to be associated more with bullying forms and procedures than with repeat and power imbalance criteria[3].There is thus an argument that bullying is somewhat normal, at least for adults. By a natural category, we mean that if a word extremely similar to bullying is absent in a lexicon, the idea is easily grasped according to the conventional definition nonetheless. The tendency seems to occur worldwide; indeed, some individuals are inclined to use others in a more disadvantaged position for their own gain in interpersonal interactions. The meaning of words is not precisely the same in other languages, although most of this variance relates to the kind of violence. Having said that, more study would definitely be desired on how key words vary in other languages and how well the common idea of bullying is recognised across cultures.Instead of definitions for each case, it is better to speak about probabilistic features or criteria. Better and less excellent examples of a category may exist, that is, some are more core or prototypical than others (for bullying - hitting vs ignoring someone). A category may have broad boundaries and fresh examples of the idea can be added (for bullying, social exclusion in the past, and cyberbullying more recently)[4].

1.3 Bullying Criterion:

We are now considering the three major bullying factors, namely harm intention (including violence), power imbalance and repetition. We don't take additional questions into account which are not essential to defining bullying even if they may be fascinating in certain instances or cross-cultural comparisons. Bullying, for example, may vary in intensity. There may be problems with how extreme bullying has to be regarded as harmful. These problems, however, are typically applicable to aggressiveness and many other notions, and need not be addressed in the definition. Furthermore, while cross-cultural bullying may differ in how much individual or group bullying is, we do not consider this a key element of the definition. Similarly, it is already implied that bullying is a question of relationships that are beneficial for practitioners and is intended to damage a particular target[5].

1.4 The Intent Criterion:

Aggression is an intention to hurt a person who is damaged (or at least threatened with harm). But how can we judge in real circumstances on intent? It is obviously essential that the behaviour, at least as far as damage is concerned, was not simply incidental. An essential criterion here is if the offender continues to behave harmfully, not to abandon and repair, even when it is told of the damage. But if the conduct itself was deliberate, how can we assess that it was really intended to harm? A frequent justification of an assailant or bullying person is that "it was only for fun" and no harm was meant.We believe three suggestive factors for the evaluation of the intention to hurt, which relate to the victim, offender and knowledgeable outsider's perspectives:

I. the victim had suffered injury; this is the criteria most apparent and utilized, although it is not ideal. Sometimes a victim may be paranoid, believing that he is threatening or attacking and reporting, even though no real danger or assault seems to be there or sufficiently apparent to warrant the so-called aggressiveness or intimidation.

II. When the culprit not only wanted to damage the conduct, but is sometimes obvious that the perpetrator was intended to harm someone. However, they could not succeed when the assault was inefficient or the target victim did not detect the attack as especially dangerous or dangerous. This criterion is thus not ideal either; is it an assault or bullying when the victim does not suffer harm? We must also remember that some victims are 'deniers,' unable to believe that anybody else is harmful to them.

III. Ultimately, we think that, although being influenced by the opinions of the victim and the offender, we feel the decision on the purpose to injure must rely on the question whether a reasonable person can assess that the conduct is likely to damage the intended beneficiary.

1.5 The Power Imbalance Criteria:

Power imbalance seems to be a key requirement of intimidation as distinguished from violence. For the victim, bullying makes it impossible to protect himself; thus, fighting equals (while violent) does not bully. How is 'power imbalance' to be defined? It is obviously multi-dimensional. However, suggestive criteria include:

I. physically weaker (for example for physical attacks)

II. being less proficient vocally (for example when teased)

III. lack of trust or self-esteem

IV. overwhelmed

V. lack of friends or support for society

VI. being in a poor position or rejected in the peer group

In an empirical study researchers examined questionnaires answering the aggressive behaviour and bullying behaviors of Scottish students 8-13 years old (where there was a perceived imbalance of power through physical strength, group size, and social popularity). Their research revealed that victims of bullying were less controlled and sadder than victims of peer aggressiveness in general[6].Another indication of power imbalance may be when the victim is in a marginalized group. Here, while individuals may be strong or confident on an individual level, the group eight they identify or believe to belong to is weaker or discriminated against. Of course, this differs from social to ethnic, racial, religious/faith, sexual, sexual or disabled contexts. In this field, the literature frequently utilizes the word harassment, for instance in racial or sexual harassment. If we consider harassment as an aggressiveness targeting someone from outside the marginalized group particularly, then power is imbalanced and this may be seen as a kind of bullying. Therefore, not all harassment is harassment, but all harassment is harassment[7].

It is not always a deficiency that puts the victim in a vulnerable or disadvantaged situation. Maybe it's neutral (new in a classroom), or a characteristic that is seen as good when observed from a third party viewpoint (e.g. more articular, having a certain skill), making it the target of peer assaults. The imbalance of power may be summed up quite frequently as being distinct from the majority of the group and thus less power within the social hierarchy. Sometimes the bullying towards immigrants is mostly social exclusion. In a 3,000 Spanish high school pupils study, researchers discovered that immigrant kids were twice as much neglected as their non-immigrant classmates. That is why bullying may be regarded as a situation phenomenon in the words of Bruner; the particular environment dictates which traits might make a person susceptible.

2. DISCUSSION

In short, 'bullying' seems to be a valid term as far as 'conventional' kinds of violence are concerned. It is characterized by a power imbalance as a core or key criteria; repeat is a secondary criterion that increases probability identification of bullying. In general, the difference between bullying and violence seems significant, both with regard to the effect on victims and for intervention approaches. More scientific explanation for the difference between bullying and violence would still be helpful, particularly when considering the view of the offenders.

Researchers have suggested that stronger empirical foundations are required in this field and that bullying is only a subcategory of a larger peer victim-ship structure[8].

Most cyberbullying research over the last six or seven years indicate a very substantial overlap between the participation of pupils in conventional bullying and cyberbullying, independent of the accuracy of measuring tools and terminology used. This overlap is one of the most well-replicated results in the relatively young cyberbullying field. As usual more students participate in conventional bullying than in cyberbullying, the clearest assertion is that the majority of the participants online also participate offline.Therefore, defining conventional bullying and applying it to the online realm is a very logical step. This leads to a very common description, that cyberbullying "is an aggressive, deliberate act performed by a group or person, utilizing electronic forms of communication, time and again, against a victim who cannot defend himself easily."

How helpful is this definition, however? First, there is a question of what "electronic forms of communication" means. Second, some writers have questioned without qualification the practice of carrying out the conventional cyber domain concept of bullying; these critiques take two similar forms. One is a criticism of the two basic characteristics characterizing bullying, namely power imbalance and repetition. The second associated objection is that a wider notion of cyber violence or techno-aggression cannot be distinguished from cyberbullying. In turn, we look at these problems in the following sections[9].

The first documented instances of cyberbullying were usually via text message or e-mail (on the Internet). Mobile and Internet-based technologies were thus regarded as 'electronic means of interaction.' In addition to texting, though, mobile phones can be used for unpleasant phone calls just like fixed phones. There was therefore already a problem whether wicked cellphone calls could be regarded as a kind of cyberbullying. Pragmatically, utilizing fixed phones seems to have been a relatively rare way of conventional bullying, while mobile phones have now become an almost essential element of the life of young people. On this premise, the inclusion of all mobile usage, including telephone calls, as potentially relevant for cyber-bullying may make sense[10].

Researchers distinguished between Internet or online bullying, bullying text messages, bullying telephones and bullying in person. There are two things to be noticed here. First, the emergence of smartphones has made an outdated difference between the usage of the Internet and mobile phones. The increasing opportunities to utilize the Internet through various technical devices may make it better to differentiate between different communications types than between different communication technologies (smart phones, computer, etc). Second, the term "in person" means face-to-face, while indirect bullying, such as rumors and social isolation, is not face-to-face and may be regarded more comparable in this respect to other types (online, text or telephone).

3. CONCLUSION

In conclusion, we believe that cyber aggression should relate to deliberate harmful behaviors towards a person utilizing electronics (computers, telephones, etc) (text, images). We also argue that cyberbullying is a notion that is different from cyber-attack. Naturally, many academics want to examine cyber aggressiveness, Internet security and other antisocial issues caused by electronic technology, but cyber bullying is a valid topic for study.We believes that the notion of cyberbullying encompasses three key elements. The first criterion is the intention to damage that is common to cyber-attack. The second requirement is the presence of a defined target for the deliberately damaging communication. The third criteria are that there is a power imbalance as a distinguishing feature of this cyber assault. Differences in technical skill between the offender and the victim, relative anonymity, social rank, the number of friends or marginalized group

positions may be evaluated in terms of power imbalances. The power imbalance should not be derived from the victim's response, but as much as possible should be evaluated from the 'outside' viewpoint.

Cyber-aggressive studies that do not contain a certain objective and power imbalance should be regarded as study rather than cyberbullying. These are key cyber bullying characteristics. Concepts are boring; therefore supplementary criteria may be useful. We show here that the recurrence is not a necessary requirement for the perpetrator. The subsidiary criteria for cyberbullying may be employed as a repetition in the wider sense, including distribution mechanisms. Similarly, the effect on the victim is a secondary criterion (e.g. if it is harmful). In both instances, their existence may judge that a cyberbullying incident is stronger.Finally, in many of the topics we have covered, additional study is required. The opinion that bullying is a natural category requires more research. Furthermore, the usefulness of different metrics to assess power imbalances in cyberbullying has not yet been explored. We now consider cyber bullying as a valid and defensible notion, but it may alter as research continues to grow and as technology is developing and new kinds of cyber bullying and cyber-aggression arise. However, we trust in our demand for more research attention and accuracy in these and related words.

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THE DEVELOPMENT OF CYBER BULLYING

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ABSTRACT

The article examines contemporary cyber bullying research, which are presented with a policy perspective. It is evident that cyber-bullying problems to public policy involve conflicts between principles of freedom of expression, the best interests of the kid and the protection of parenthood and schools. The development of an effective plan includes all stakeholders, policy makers, school managers, parents and young people, in the sphere of the problem, as well as conflicting values. It must be emphasized that the literature which delineates the differences between conventional bullying and cyber bullying is extremely different, and that the two must be addressed and evaluated separately. The next parts thus lay forth cyber bullying ideas and frameworks for policymakers, who consider new and/or updated regulations, examine the problem and Internet harassment psychology, explain its physical and mental consequences and sum up results from current cyber bullying surveys. Finally, the paper concludes with recommendations for implementing acceptable usage rules at the school board and at the local school levels, as well as family contracts for home use.

KEYWORDS:*Bullying, Bullying Prevention, Cyber Bullying, Policy, Victims.*

1. INTRODUCTION

Victims of cyberbullying are often subjected to severe psychological and emotional distress. In a few of cases, this has resulted in terrible acts of physical violence. For many of the victims, loneliness, humiliation, and shame were all or a mix of the emotions they were experiencing at the time. Several horrifying instances of cyberbullying that have ended in suicide have also been reported in the media, according to the press. These results are concerning for worried parents and educators who are looking for explanations for their children's behaviour. This study was also carried out in order to offer teachers and parents with an overview of some of the most effective methods for establishing a cyberbullying prevention programme for their students. As a starting point for our study, we looked at the development of bullying and its relationship to cyberbullying.

Bullying is characterized by the exhibition of hostile actions that are adversarial and planned in their nature. Bullying occurs when "another person is subjected to physical or emotional harm."

Bullying that results in mental and bodily damage has led to the need for legal action by the general public. Bullying has progressed beyond a few harsh remarks spoken in person to multi-media interaction that may be sent via a variety of technological means. The development of electronic communication serves as the foundation for cyberbullying. Cell phones are used for cyberbullying, which takes place via text messages, Twitter, and the Internet[1].

A frequent feature of the media is the dissemination of "breaking news reports" and special programming warnings against cyberbullying. For openers, ABC News recently broadcast a two-hour 20/20 programme titled "Bullied to Death in Schools in America," which explored the issue of bullying in schools. According to the information presented in this video, at least 14 adolescents committed themselves in the previous year as a consequence of being bullied. Dilmac has done a number of studies that have shown that cyber bullying is not just a problem in North America, but is also a worldwide problem, according to the findings. As a means of defending themselves against such acts of violence, government agencies, schools, and other places of work have tried to establish regulations.

Dan Olweus, a researcher who is widely regarded as a pioneer in bullying research, has been mentioned in many studies that have been conducted as a result of his expertise in this area. The first book written by Olweus was named "Aggression on the Schools: Bullies and Whipping Boys" and was released in 1973. This marked the beginning of his more than four decades of investigation into bullying problems in the United States and other countries. 'Olweus claimed that bullying is a result of a power imbalance,' according to researchers, in his observations[2].

Olweus is credited as being the first to implement an anti-bullying programme. His anti-bullying design includes classroom activities as well as workplace techniques that may be utilized to assist disperse bullying operations in the workplace. Olweus started a campaign in the early 1980s to draught legislation to combat bullying in schools, which has subsequently been signed into law by the president of the United States. As a result of his work, some schools have experienced a 50 percent reduction in bullying. Administrators and other instructors have said that the work done by Olweus has unquestionably shown to be worthwhile and has improved student safety.

The United States Secret Service conducted a research to analyze the characteristics of pupils who had committed criminal offences, and the results revealed that intimidation was one of the main causes leading to criminal activity. In 12 of the 15 campus shootings that occurred throughout the 1990s, the shooters had a history of being harassed. Bullying in the past consisted of violence against the weaker opponent, compulsion, and physical abuse, among other things. Bullying was more prevalent in schools and throughout the day. The outcomes usually result in the stronger opponent winning the championship and, in certain cases, the seizure of someone's lunch money.The innate drive to survive is shared by all living things and is a universal human trait. Because of the large number of species on the globe and the limited number of natural resources available, survival is directly linked to competition. Throughout history, there has been a continuous desire to outperform others while also overcoming challenges. As the human race has progressed, this survival instinct, as well as a competitive environment, have stayed essentially unchanged[3].

Both of these forces have spilled over into the domains of education, social interaction, and economic activity. Despite the fact that this competitive hierarchy is widespread in most civilizations, it differs between cultures based on their ethical systems, customs, and the level of government control they have. Unfortunately, the capitalistic culture of the United States unintentionally promotes the notion that success and money are inextricably linked. As a result of this mentality, a society has been created in which bullying is inadvertently taught as a survival strategy from an early age.From the moment a kid enters elementary school in the

United States, he or she is encouraged to strive to be the greatest person possible. This apparently simple lesson may take on many meanings as a kid grows and develops during his or her educational career. Students often acquire dishonest methods of gaining an advantage in the highly competitive scholastic and social settings that grade school provides. Bullying methods may include pushing others for answers on assignments in order to get higher marks, which in turn leads to greater college prospects, or spreading social rumors about other students, among other things[4].

These strategies are hazardous because, once a student understands how successful they are, he or she may utilize them to build a life style around themselves. The development of a regular use of bullying techniques may have a detrimental impact on an untold number of individuals and can even result in corruption in the workplace.

1.1 Bullying Progression to Cyberbullying:

The incidence of schoolyard bullying has increased significantly in the United States over the last thirty years, which may be linked to an increase in the number of suicide and murder cases in certain areas. When concentrating on the cause for bullying, the reaction is often based on something about the victim that they are unable to change or improve. People who are self-conscious about their hair color, sexual orientation, physical size, or socioeconomic position are good examples. According to study conducted by 'Fight the Crime Teen,' some of the most common causes for cyber bullying include a person's interest in a male or female, their looks, their race or ethnicity, and their sexual orientation. The Deficiency Model of Social Skills is used by Safran, who theorizes that bullies victimize others in order to maintain their power and social position.

There is a contradiction between the differences of victimization from elementary, middle, and secondary schools in terms of physical, psychological, and behavioral aspects. Elementary children may engage in name-calling and name-hitting among themselves using simple names. Cell phones have been made available to middle school kids by their parents, who generally do so at the insistence of their children. Elementary kids' usage of computers in school may be limited to navigating through instructional programmes, while middle school and high school students utilize computers to create programmes, write papers, and have more flexibility to connect with various websites than elementary students. The disparity in grade levels demonstrates the necessity for each set of students to be informed of proper computer etiquette and how to avoid computer abuse[5].

Bullying may have an effect on children of all ages and grade levels, regardless of their chronological age. This fact has been the subject of investigation since the late 1960s. Due to the lack of access to technological gadgets in primary schools, these kids were confined to physical and verbal abuse of their classmates as a form of expression. Students in middle and high schools have access to technological gadgets, which they may use to initiate cyberbullying.

1.2 Bullying Prevention and Intervention:

A significant number of anti-bullying preventive efforts are required in order to completely eradicate this harmful behaviour. Policy initiatives have also been created to address this social problem at the municipal and state level by governmental entities. Mandatory reporting regulations place education professionals in positions of responsibility in order to safeguard children. In addition, the Anti-Bullying Act was passed in order to enforce strict restrictions against all forms of bullying, including cyberbullying. Strategies have been developed by the European Commission to assist in the protection of their websites. Their goal is to provide information to users. This safety precaution was put in place for the benefit of children,

instructors, and parents. Schools must ensure that teacher and student processes and teaching are followed, and they must offer advice to parents[6].

In Texas, school districts have adopted and implemented a "Zero Tolerance Bullying Policy," which means they will not tolerate bullying of any kind. The Fort Worth Independent School District in Texas has launched the "It's Not Okay Campaign" to raise awareness about bullying. The goal of this initiative was to provide assistance to victims while also encouraging others to speak up about improper actions they may have seen. The programme teaches kids how to identify sexting, cyberbullying, dating abuse, and other issues that are important to be aware of. Teaching appropriate student conduct is essential in the development of self-esteem, self-efficacy, and confidence in one's own abilities within a social context. Employee wellness programmes, which provide one-on-one counselling services for problems such as anger management, depression, domestic abuse, and workplace difficulties, are becoming more popular among companies.

1.3 Cyberbullying Culture:

This problem has grown so important that it has been adopted by popular culture. When one of the characters was harassed when it was discovered that he was gay, a recent episode of Glee, On My Way, brought the negative consequences of cyber bullying into the spotlight. Immediately after the programme aired, the Trevor Project Web Site, which is a nationwide organization that assists LGBT suicide prevention, experienced an unprecedented 300 percent spike in visitors. It was recorded in the ABC Family movie "Cyber Bully" how the character of a young girl suffered because of a miscommunication with her pals. The movie was a success. This demonstrated the negative consequences of cyberbullying on both the victim and the offender, as well as on other members of the community[7].

Everyone, even those who were not directly engaged, was adversely impacted. In school, the survivor saw a decrease in her social position, which she took personally. During this time period, her parents were in the process of getting divorced. The victim purposefully deceived her mother via a sequence of events and planned to meet up with new acquaintances she found on the Internet, according to the prosecution. Eventually, these pals turned on her and began cyberbullying her on the internet. Unfortunately, the victim believed that planning her own suicide was the only way to get away from her severe mental anguish. According to the CDC, victims of bullying are more prone than non-victims to have physical and mental health issues, as well as to consider taking their own lives[8].

2. DISCUSSION

Despite the fact that bullying was only initially characterized in the late 1970s, there is already a substantial body of scientific study on the issue that has been conducted. If we start with Olweus' definition of bullying and keep in mind later modifications to that description that took into account moral and practical considerations, bullying can be described as an essentially psychosocial problem involving the intentional, repetitive harming of another person and the creation of a power imbalance between the victim and the aggressor, with negative consequences for both the victim and the aggressor. It is important to note that the repercussions of a power imbalance created between the two are different for the victim and the aggressor since the impacts of the power imbalance are of a moral character.

Bullying has been proven to have negative consequences in the social circles of people who are bullied. For example, research has shown that when bullying occurs, the quality of peer network connections degrades. Bullying is, in reality, a complicated phenomenon that involves both the personality and history of individuals engaged as well as a variety of environmental variables. School climate has been characterized as either a factor of danger or a factor of protection,

depending on the quality of the environment. The improvement of the school environment, especially in the construction of norms, values, and expectations of support, is the foundation of bullying prevention and intervention programmes, which are designed to deal with this kind of issue. According to findings from evaluations of such bullying prevention and reduction programmes, levels of victimization and bullying have decreased significantly, although to a lower degree, compared to the baseline[9].

In terms of individual characteristics, empathy is regarded to be one of those that have the greatest impact on the prevention of participation in bullying in the aggressor position, according to research. Equally important in anti-bullying programmes are the abilities to perceive the moods of others, to develop both cognitive and affective awareness of others, to understand the victim's feelings, and to recognize the potential impact that an unjustified attack may have on the victim. These abilities appear to contribute to the reduction of problems of unjustified harassment and abuse.

Notably, the most intriguing bullying research has been conducted in the psycho-educational area, and many of the studies conducted have attempted to develop preventative and palliative methods to fight the issue. When it comes to identifying the essential components of effective action, bullying research has made significant strides. However, bullying as a phenomenon has evolved, due to the influence of information and communication technologies (ICTs) on interpersonal interactions, among other factors. As a consequence, academics are now concentrating their efforts on bullying that occurs in the context of social contact via digital devices, culminating in the creation of a totally new concept known as cyberbullying. Cyberbullying, which is considered an extension of conventional bullying, is described as hostile, deliberate actions carried out through information and communication technologies (ICTs) and resulting in a power imbalance. It seems to be gaining popularity as a form of violence among schoolchildren and young people in general.

Cyberbullying has many of the same risks as conventional bullying, but, possibly as a result of its unique character, it also carries additional risks that should not be ignored. One such factor is the lack of control over personal information, which may be the result of a lack of understanding of the risks associated with sharing personal information on the Internet, sharing passwords, communicating with strangers, and publicly displaying very personal information such as addresses and telephone numbers. This lack of control, along with the victim's resulting vulnerability, may be regarded a distinguishing trait of cyberbullying. The existence of a link between cyberbullying and Internet addiction has also been discovered, with the latter being defined as a constant desire or need to connect to the Internet that restricts forms of entertainment and social relationships, negatively impacts an individual's mood and irritability, induces violent, aggressive behaviour that makes it impossible to disconnect, and increases the user's own social isolation. Excessive usage of some technology foreshadowed the occurrence of cyberbullying[10]. The following factors were identified as having an impact on cyberbullying victimization in a large sample: gender, marital and socioeconomic status; purpose; frequency; location; time and type of Internet usage; and language ability. In another recent study, researchers looked at mental symptomatology as a predictor of cyberbullying among university students, and they discovered that it was true. Once again, there is no behavioral connection between this kind of scenario with victims or aggressors in conventional bullying situations.

3. CONCLUSION

Bullying has progressed from fist fights in the schoolyard to the assignment of virtual personas on the internet. The necessity for an increase in the protection of victims has also been related to proper electronic interaction etiquette. The necessity for students, parents, teachers, coworkers, and others to report harassment is a major element in reducing the prevalence of cyberbullying in

the United States and throughout the world. Because many parents and older people lack computer skills and knowledge, cyberbullying may be frightening for them. Therefore, increasing their learning as a form of empowerment is essential to reducing their fears. Bullying prevention methods are intended to detect and divert instances of innocent people being victimized by others.

The effectiveness of these policies is being evaluated on a continual basis. Through changes in law as well as increased public support, federal, state, and municipal governments have maintained their focus on the necessity of resolving social problems. These initiatives may be beneficial in the battle against bullying. As social networking platforms continue to expand and communication advances in other nations, it is critical that we stay vigilant in protecting our children from cyberbullying and other kinds of online harassment. The ramifications of cyberbullying include negative consequences for individuals, families, and society.

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AN OVERVIEW ON NEURON

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ABSTRACT

For decades, neurons were thought to be the brain's basic computational units, summarizing incoming signals and eliciting action potentials only in response to suprathreshold stimuli. Although modeling studies predicted that single neurons would be a much more powerful computational entity capable of performing a wide range of nonlinear calculations, this possibility was not tested experimentally until active mechanisms in the dendrites of most neuron types were discovered. We review a number of modeling studies that have looked at information processing in single neurons, starting with those that characterize the arithmetic of different dendritic components, moving on to those that look at neuronal integration at the cell body, and finally, those that look at the axon's computational abilities. We present model predictions alongside supporting experimental data in order to emphasize the importance of modeling work in furthering our understanding of single-neuron arithmetic.

KEYWORDS: *Brain Modelling, Dendrite, Nonlinear Computations, Single Neurons.*

INTRODUCTION

One of the most fascinating and difficult problems in modern biology is figuring out how the brain works. Despite the wealth of knowledge about the molecular and biophysical mechanisms that underpin neuronal activity that has accumulated over the years, similar advances have yet to be made in understanding the rules that govern learning and memory and the connection between the brain structure of a neuron.Computational models combine a theoretical framework with a technological platform to help us better understand how the nervous system works. Certain tools are better suited to analyzing and interpreting complex data sets, such as multi-channel recordings from hundreds of neurons, while others are better suited to simulating the activity of single cells, neural networks, or networks of networks at various levels of abstraction. Researchers can use interactive models of the systems under study to investigate several hypotheses quantitatively thanks to the development and application of such modeling tools. These models, when combined with experimental techniques, make hypothesis testing easier and aid in the identification of important follow-up experiments[1]–[4].

Computations by a Single Neuron:

Most neurons are made up of three main structural units: dendrites, soma (cell body), and axon. They can be as simple as bipolar cells in the retina or as complex as Purkinje cells in the cerebellum. Axons and dendrites have been thought of as simple transmitting devices that communicate signals to and from the soma, where threshold computations take place, for decades. As a result, neuronal cells were first depicted as spherical point neurons with only a cell body, and information transfer was assumed to be solely dependent on their average firing rates. However, computational and, more recently, physiological studies have shown that differences in the morphology and ionic conductance composition of different neurons provide the cell with far greater computational abilities than a point neuron. The structure of a neuron is shown in Figure 1.

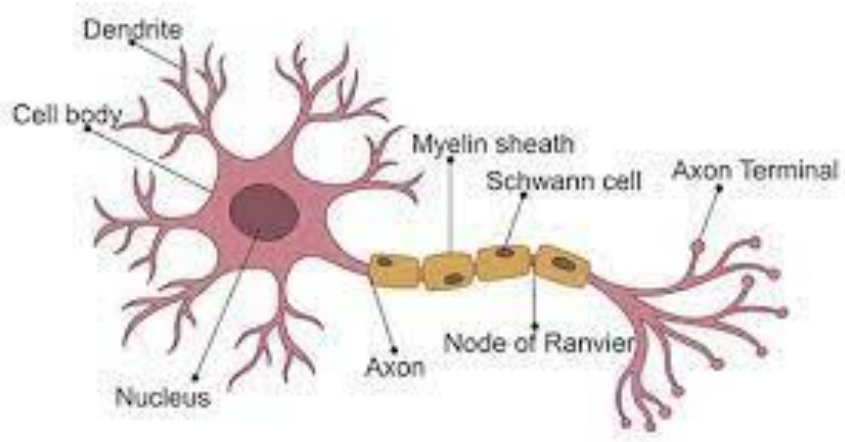

Figure 1: Illustrates the structure of Neuron[5].

Dendrite-Based Computing:

Old buildings are given new functions. Dendrites are no longer thought to be simply passive wires that transmit incoming impulses to the cell body. Dendrites seem to be capable of performing a range of computational tasks, including temporal integration, signal amplification and attenuation, and detection of concurrent incoming inputs, based on mounting evidence emphasizing their active involvement in signal integration. In this part, we concentrate on insights obtained mainly from modeling research and use a bottom-up approach, beginning with the smallest dendritic subunit—the spine—and working our way up to the impact of network activity on dendritic and, ultimately, neuronal function.

Excitable Spines do the following computations:

Ramon y Cajal anatomically discovered dendritic spines in 1911, naming them espinas because to their similarity to thorns on flower stalks. Theoretical results initially suggested that the anatomical features of spines, as well as the existence of voltage-gated ion channels, allow for compartmentalized gain modulation of synaptic inputs in spine heads—that is, information from two or more sources may be integrated nonlinearly. Strong inputs, according to the models, may trigger local dendritic spikes, which can then activate other adjacent spines, amplifying incoming signals locally. Individual spines may conduct nonlinear integration of incoming coincident signals, resulting in a spatially limited amplification of dendritic events as a consequence of their interaction. If synaptic input is scarce, the spine membrane's increased resistance and capacitance burden, along with the small spine neck, acts as a local filter, favoring linear integration. According to a recent compartmental modeling research, the effectiveness of somatic action potentials for penetrating apical dendrites in CA1 pyramids may be explained by spine shape and a high density of sodium ion (Na+) channels on spines. This suggests that these structures have a

function in back-propagating signal regulation and perhaps coincidence detection. These findings point to the intriguing potential that dendritic sections with tiny clusters of spines may function as independent computing units. Short (about 40 m) basal dendritic compartments of layer V pyramidal neurons were found to sum local signals as individually thresholded sigmoidal units in a recent experimental investigation, which supports this theory[6], [7].

Computations Dendritic:

Is it conceivable that various spatial arrangements of synaptic inputs are differently received by the cell if sparse and clustered synaptic inputs are variably detected by a dendritic section? Early neuron models that included passive dendritic characteristics and used the cable theory—that is, how voltage changes travel along dendritic segments—suggested that inputs arriving at different sections of the dendritic tree might be added linearly. This indicated that the place didn't matter. Closely spaced inputs, on the other hand, were believed to mix sublinearly as a result of the activation of a shunting current. Despite the early models' simplicity and the existence of a variety of active membrane processes that might theoretically allow supralinear dendritic integration, experimental data from different neuron types has largely backed up the linear or sublinear summing rule. However, strong thresholding events have been identified in the thin dendrites of neocortical and CA1 pyramidal cells in at least two investigations.

Effects of Normalization on Synaptic Integration:

While dendritic regeneration events allow for gain control of neuronal output, passive characteristics and K+ conductances in the dendrites work to spatially normalize and temporally integrate inputs, allowing the neuron to process information in a different way.Due to the ‘large voltage attenuation and significant temporal delay' of propagated signals, these passive properties (such as membrane time constant, input resistance, and dendritic length) allow for differential integration of synaptic inputs that arrive at distal or proximal parts of the dendritic tree. Simultaneously, the inclusion of a hyperpolarization-activated potassium ion (K+) conductance (I h) in a CA1 compartmental model was shown to account for the experimentally observed normalization of EPSPs originating from various parts of the dendritic tree, resulting in similar depolarizations at the cell body. Additional modeling studies revealed that I h is important in establishing the temporal window for input summation at subthreshold levels, allowing coincidence detection while reducing the efficacy of non-synchronized inputs. Other dendritic K+ conductances may either assist or oppose I h's temporal summation effect.

Finally, the long-standing but mostly ignored impact of network activity-induced background noise on neuronal information processing should be addressed. Background activity in a passive neuron model dampens the efficacy of asynchronous—but not synchronous—inputs in producing a somatic action potential, according to Bernander and colleagues (1991). As a result, it's easier to tell the difference between 'unimportant' and'meaningful' messages. In a more detailed cortical neuron model with active dendritic conductances, intense synaptic network activity increased membrane conductance, promoted the place effect of inputs having arrived onto different dendritic regions, and increased the probability of dendritic spike initiation and forward propagation to the axon. As a result, incoming background noise from network activity may have a significant impact on a neuron's integrative characteristics, such as altering the temporal window for dendrite nonlinear effects[8]–[11].

At The Cell Body, Information Is Processed:

Dendrites help with nonlinear summation of inputs, whereas the soma may help with a different type of information processing, such as enabling a persistent firing mode even when the brain is not stimulated. In addition to traditional network mechanisms, recent experimental and modeling studies have highlighted the importance of somatic intrinsic membrane mechanisms in

generating and maintaining persistent activity. In vitro work in the entorhinal cortex revealed that pharmacological stimulation of muscarinic acetylcholine receptors in response to somatic or synaptic stimulation activates a slow Ca2+-dependent mixed ionic (CAN) conductance, allowing a single neuron to generate graded persistent activity. The slow temporal decay of the EPSP, the CAN conductance, or the Ca2+-induced Ca2+ release mechanism may all play a role in the maintenance of a stable persistent state at low physiological frequencies (10–50 Hz), according to modeling work.

Using Axons to Compute:

Axons serve as a conduit for information to flow across neuronal assemblies in the form of action potentials. Several computational studies, including the seminal work of Hodgkin and Huxley, have shed light on the ionic mechanism for action-potential generation as well as the action-potential initiation site. Recent research focusing on the accuracy and reliability of action-potential generation and propagation suggests that changes in axonal geometry and ionic conductance composition can alter these properties, which are critical for normal information processing. Goldstein and Rall (1974) first implicated the above structural characteristics in modifying the action-potential curve and propagation speed in simulated axons with changing diameter and different branching patterns. Another computational study found that synaptic boutons in different terminals are activated asynchronously in a reconstructed axon of a layer V neuron in the somatosensory cortex after quantifying the effect of such morphological changes on action-potential propagation velocity. It's also been suggested that the density and type of ionic channels along the axon and branching points may be used to control action-potential propagation. In both simulations and experiments, activation of just a few clusters of A-type K^+ channels has been shown to gate axonal propagation of impulses in CA_3 neurons.

DISCUSSION

The neuron is the brain's fundamental working unit, a specialized cell that transmits information to other nerve cells, muscle cells, and gland cells. Neurons are nerve cells that transmit information to other nerve cells, muscle cells, and gland cells. A cell body, an axon, and dendrites are all present in most neurons. This isn't a simple issue to answer, at least for neurons in the brain. However, there are three kinds of neurons in the spinal cord: sensory, motor, and interneurons. Neurons are transmitters of information. They carry information between various regions of the brain and between the brain and the rest of the nervous system via electrical impulses and chemical signals. Neurons are made up of three fundamental components: a cell body, an axon, and a dendrite.

CONCLUSION

For many years, neuroscientists thought that the neuron, which receives and analyzes incoming impulses from neighboring cells, was the brain's transistor or basic processing unit. We propose in this study that the morphological and ionic characteristics of dendrites, soma, and axon equip these structures with a variety of computational skills that may allow them to contribute differently to neuronal activity.The ultimate challenge for future modeling and experimental research is to link computational characteristics to behavior. Recent studies in Drosophila and mice using modeling, physiological, molecular, genetic, and behavioral methods have shown the role of various voltage-dependent K+ conductances in light processing by photoreceptors and in correcting age-related learning and memory deficits, respectively. Such multidisciplinary approaches, in which designs have been used to formulate experimentally accurate hypotheses and experiments are used to verify and refine the predictions, will allow for a more in-depth investigation of how different neuronal elements as well as the nucleus as a whole make a contribution to processing capabilities as well as actions.

The following open issues may offer fertile ground for partnerships between molecular biologists, evolutionary biologists, physiologists, modelers, and behaviorists in furthering our understanding of the brain's mysteries. Do particular neural computational processes need certain behaviors? What elements of the brain circuit or the neuron are in charge of these tasks? What are the chemical processes that underpin the various neural integration working modes? Such integrative methods should bolster the emerging notion, backed up by this research, that something less than the cell is at the core of brain computing.

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COMPARATIVE ANALYSIS OF CONSONANT COMBINATIONS IN RUSSIAN AND UZBEK LANGUAGES AS WELL AS IN KHOREZM DIALECTS

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ABSTRACT

The main goal of studying the Russian language in the modern general educational Uzbek audience is the practical mastery of the Russian language by students. To achieve this goal, it is necessary to firmly and consciously master this language by students, which is carried out by solving a number of methodological problems. One of them is taking into account the peculiarities in the study of the Russian language. In the assimilation of the Russian language by Uzbek students, a number of difficulties are encountered, which are caused, on the one hand, by the specific features of its grammatical system, on the other hand, by the interfering influence of the Russian language of students on the studied Russian language.

KEYWORDS:*Comparative Analysis, Combinations, Khorezm Dialects.*

INTRODUCTION

To achieve this goal, it is necessary to firmly and consciously master this language by students, which is carried out by solving a number of methodological problems. One of them is taking into account the peculiarities in the study of the Russian language.

In the assimilation of the Russian language by Uzbek students, a number of difficulties are encountered, which are caused, on the one hand, by the specific features of its grammatical system, on the other hand, by the interfering influence of the Russian language of students on the studied Russian language.

The path to mastering the specifics of the Russian language and overcoming the interfering influence of the native language in students lies through a deep understanding of the features of the studied Russian and native languages by students. In the implementation of this task, an important place is occupied by the use of comparing the phenomena and facts of the Russian language with the phenomena and facts of the students' native language. Of great importance in

understanding the grammatical laws of the Russian language are students' knowledge of their native language, translation of terms, comparison of facts of both languages, etc.[1]

The need to take into account the facts of the native language when teaching the Russian language is caused by the fact that the process of mastering the Russian language differs from the process of mastering the native language.

If the assimilation of the native language proceeds simultaneously with the process of the development of thinking, then the Russian language, which Uzbek children usually begin to study from the age of seven / in the first grade /, is assimilated by students if they have already developed in varying degrees of thinking, formalized within the framework of native language systems.

As long as the assimilation of a non-native language has not reached active mastery of it, the native language system exerts quite strong pressure on the process of assimilation of a non-native language. Therefore, taking into account the peculiarities of the native language, it is possible to eliminate the possibility of its pressure on the process of mastering the Russian language.

Realizing the difference between the two languages, students, in the practice of Russian speech, will strive to avoid the pressure of the system of their language and thereby avoid possible mistakes.

This circumstance requires the development of a special methodology for teaching the Russian language to a non-Russian (language), based on the principle of strict consideration of the peculiarities of the students' native language.

The native language is the result of long-term language experience, therefore it is impossible to exclude it from the process of mastering the Russian language. The laws of the native language have become so entrenched in the consciousness of the student that he inevitably perceives new facts of the Russian language through the prism of the native language system. This system influences all the activities of the Uzbek student aimed at mastering the Russian language.

Academician L.V. Shcherba wrote that the native language can be expelled from the process of teaching a second language, but it is impossible to expel it from the heads of students in their environment, where Uzbek is spoken at every step.[2] Therefore, Shcherba proposed a path of conscious repulsion from the native language, when students must study every new phenomenon of a foreign language, comparing it with the corresponding phenomenon of their native language.

Comparisons play an important role in human mental activity. Comparison helps to see the characteristic features of objects and phenomena, to get to know them better. The importance of comparison (matching) is also great in the assimilation of educational material. Comparing the structure of a non-native language with the structure of their native language, students consciously assimilate the features of the language being studied and at the same time delve deeper into their native speech.

Comparisons are possible in all sections of the Russian language course: vocabulary, phonetics, grammar, spelling and punctuation.

In this article, the object and subject of research is - fully identify the similarities and differences between the Russian language, the Uzbek literary language and the Khorezm dialect, provide information about the Khorezm dialect subsystem of consonants between the Russian and Uzbek literary systems, about the acoustic-articulatory features of the Russian, Uzbek languages and Khorezm dialects.

In Uzbekistan, in addition to English, which came in second place after the native language, Russian continues to occupy one of the leading places. Therefore, it is very important, at present,

to study the classification of consonants of the Russian, Uzbek and Khorezm dialect in a comparative plan, in order to eliminate inaccuracies in the pronunciation of certain consonant sounds by Khorezm students.

For Uzbek and Khorezm students, special difficulties arise in the assimilation of the material, phonetic side of the Russian language - its phonetic-phonological system.

The relevance of the topic of the article is that the study of the phonetic aspects of the Russian and Uzbek languages, and the Khorezm dialect helps to master the Russian language perfectly.

The scientific and practical significance of the research lies in the scientific substantiation in Russian of an effective methodology that allows to eliminate phonetic interference in teaching Russian to the Uzbek (Khorezm) audience, as well as to lay the foundations for correct pronunciation.

The research results can be used in practical lessons, as well as in theoretical and experimental lessons in phonetics.

To achieve this goal, it is necessary to solve the following tasks:

1) To identify and describe the initial level of knowledge, skills and abilities in the pronunciation of Russian consonants in the speech of students of Russian-speaking groups for students speaking the Uzbek (Khorezm dialect) and the reasons for phonetic errors in speech;

2) To find phonetic problems of consonant sounds that appear in Russian pronunciation and work to overcome these problems when teaching Russian to Khorezm students and schoolchildren;

3) A comparative description of the phonetic systems of the Russian and Uzbek and the identification of lexical errors in the pronunciation of consonants, i.e. study of the consonantism of the Russian language in the Russian speech of Uzbek students and schoolchildren of the Khorezm region, taking into account the peculiarities of the Uzbek language and the Khorezm dialect;

4) Development and explanation of a set of phonetic exercises for teaching the correct pronunciation and spelling of Russian consonants in the Khorezm audience.

The problems of teaching the Russian language, which are based on the study of the phonetic structure and pronunciation norms of the Russian and Uzbek languages in our country, have been developed in the works of such prominent scholars as G.Kh. Bakieva, A.A. Freiman, A. Madrakhimov, G. A.Gleason, and Lebedeva Yu. G., Trubetskoy G.S., Shansky N.M., Barkhudarova E.L., Kasatkina R.F., Bondarko L.V., Verbitskaya L.A., Gordin M.V., Verbitskaya L.A., Ignatkina L.V., Vereshchagin E.M., Lyubimova N.A., Musatov V.N., Rozova O.G., Kissen I.A., Abdullaev F.A. A., Matusevich M.I., Polivanov E.D., Reshetov V.V. and etc.

The technique of eliminating phonetic interference when teaching Russian in the Uzbek (Khorezm) audience has also been previously studied by researchers. But in these studies, the main attention was paid to the pronunciation of the vowels of the Khorezm dialect - Allabergenov B.K., Urazova M.B.

This work will help to positively solve the problems in teaching the correct pronunciation of consonants in Russian, as well as in improving the educational process in non-linguistic universities.

The linguistic material is studied on the basis of the experience of the comparative-typological analysis of phonological units used in modern linguistics. The article examines the features of the phonetic interference of Russian speech, caused by discrepancies in the systems of consonantism of the native (Khorezm) and studied Russian languages. On the basis of the

comparison of “contacting” systems, methodological recommendations are proposed for teaching foreign language groups to Russian pronunciation, taking into account the dialect phonetics of consonants.

The main task is to systematize and generalize the theoretical base existing in science for the comparative-comparative study of the phonological systems of the Russian, Uzbek languages and the Khorezm dialect.

Too successfully master the norms of the Russian literary language, students need to take into account the existing similarities and differences in the phonetic systems of the studied languages.

In this case, the greatest attention should be paid to the functional aspect of phonetics, that is, a comparative analysis of the phonological systems of the Russian, Uzbek and the Khorezm dialect.

It should be emphasized that in recent decades, quite a lot of attention has been paid to the comparative analysis of the Russian, Uzbek and the Khorezm dialect.

Nevertheless, very few works devoted to the actual problem of comparative analysis of phonological systems of consonant sounds of Russian, Uzbek and Khorezm dialect have been created in recent years. Russian and Uzbek consonants and vowels are compared, however, most of the analysis is done, and the consonant letters and sounds of the Khorezm dialect are not studied so thoroughly, and often if you compare the structure of the Russian and Uzbek languages, you can find similar features in them. And the structure of Khorezm speaking differs markedly from the structure of the above-mentioned languaTo fully understand the similarities and differences between the Russian, Uzbek literary systems and the Khorezm dialect subsystem of consonants, it is necessary to refer to the data of acoustic-articulatory features of the phonemes of these language systems.

Each of these languages has a system of vowels and consonants.

Vowels are sounds that, unlike consonants, arise during the formation of a tone - without the participation of noise, i.e. when pronouncing vowels, no obstacles arise in the oral cavity and the sound passes directly without overcoming any obstacle.

Consonant sounds are sounds, when pronounced, obstacles arise in the path of the air jet in the oral cavity as a result of air friction against the walls, as a result of which a voice + noise or only noise appears.

There are 6 vowel phonemes in the Russian language, which do not differ in length and brevity, and 37 consonant phonemes.

The total number of phonemes in the Russian and Uzbek languages, with quantitative proximity, has a significant discrepancy in qualitative terms.

This is due to the fact that in Russian phonetics, hard and soft sounds are denoted by the same letter, for example: *сэр (сэр)* and *сер (сэ’р)*. And also the six main vowel sounds are indicated by ten vowel letters:

(и) – и (милый),

(ы) – ы (мыло),

(а) – а (май) и я (мойа),

(о) – о (мой) и ё (йолка),

(э) – э (это) и е (мел),

(у) – у (куст) и (йула).

Hence it can be seen that to denote the four vowel sounds (a), (o).(э).(y), there are two rows of letters, these are: 1) a, o, э, y ; and 2) я, ё. е, ю.

There are 37 consonant sounds in the Russian language.

Let's compare the phonetic structure of the Russian and Uzbek languages, and Khorezm speaking.

The main features of consonants are the place of formation, the method of formation and the participation of the vocal cords.

Depending on the place of formation in the Russian language, consonants are distinguished:

1) Labial,

2) Antero-lingual,

3) Middle-lingual,

4) Posterior-lingual.

According to the method of formation, sounds differ in:

1) Bowed,

2) Explosive,

3) Bowed-through,

4) Affricates,

5) Slit,

6) Trill consonants.

Depending on the participation of voice and noise, the following differ:

1) Sonorous

2) Noisy consonants.

Noisy, in turn, according to the participation of voice and noise are divided into:

1) Voiceless

2) Voiced

The specific signs of consonants of the Russian language are:

1. Soft

2. Hard[3]

And now let's characterize each consonant sound separately.

And now let's characterize each consonant sound separately.

(b - b') - Consonant, noisy, sonorous, bowed, labial, paired in deafness and softness, eg: robot (b) - child (b'),

(в – в')– Consonant, noisy, ringing, bowed, labial-dental, paired for deafness and softness, eg.: ворота (в) – ведро (в'),

(г – г') – Consonant, noisy, ringing, bowed, middle-lingual, paired for voiceless and softness, eg.: город (г) – герой (г')[1]

(д – д’) - Consonant, noisy, voiced, occlusive, front-lingual, dental, paired for voiceless and softness, eg.: лом(д) – (дед) (д’),

(ж – ж’) - Consonant, noisy, voiced, slit, front-lingual, dental, eg.:Жора (ж) – Женя (ж’),

(з – з’)- Consonant, noisy, voiced, slit, front-lingual, dental, paired for voiced and softness, eg.: роза (з) – зебра (з’),

(п – п’) - Consonant, noisy, voiceless, slit, labial, paired in sonority and softness, eg.: парад (п) – вперед (п’),

(ф – ф’)- Consonant, noisy, voiceless, slit, labiodental, paired in voicing and softness, eg..: фонтан (ф) – фиалка (ф’),

(к – к’) - Consonant, noisy, voiceless, slit, back-lingual, paired for voice and softness, eg.: рок (к) – километр (к’)

(т–т’) - Consonant, noisy, voiceless, occlusive, front-lingual, dental, paired in voicing and softness, eg.: рот(т) – тень (т’),

(с – с’)- Consonant, noisy, voiceless, slit, has pairs in voicing and softness, eg.: соль (с) – село (с’),

(ш – ш’) - Consonant, noisy, voiceless, slit, front-lingual, alveolar dental, has pairs in voicing and softness, eg.: шорох(ш) – шелест (ш’),

(х – х’) - Consonant, noisy, slit, back-lingual, has a pair of softness, eg.: хорек (х) – херес (х’),

(ц) - consonant, voiceless, affricate (occlusive-slit), front-lingual, dental, has no pair, eg.: цирк (ц),

(ч’) - Consonant, voiceless, affricate (occlusive-slit), anterolingual, palatal - dental, eg.: часы (ч’)

(л – л’) - Consonant, sonorous, occlusive-anadromous, lateral, has a pair of softness, eg.: лось(л) – лес (л’),

(м – м’) - Consonant, sonorous, occlusive - anadromous, nasal, labial, has a pair of softness, eg.: море (м) – мел (м’),

(н – н’) - Consonant, sonorous, occlusive-anadromous, nasal, front-lingual, dental, has a pair of softness, eg.: нора (н) – лестница (н’),

(р – р’) - Consonant, sonorous, trembling, front-lingual, palatine-dental, has a pair of softness, eg.: robot (b) - cutting (р’),

(й) - consonant, voiced, unpaired soft, sonorous, eg.: рой (й’).[4]

Combinations of consonants are pronounced differently.

In some combinations of consonants (*сш, зш, сж, зж, тч, дч, тц, дц*), the previous sound is completely similar to the previous one, as a result of which a double (long) sound occurs.

Other combinations *(тс, дс, тьс, жч, сч, зч*) are pronounced as one sound, and in the spelling not one of the letters corresponds to the spoken sound.

In the third combinations, double pronunciation is possible. So, the spelling combination *чн i*n most cases denotes the sound *[ч’н]*, for example: *вечный – ве[ч’н]ый, загадочный – загадо[ч’н]ый.*

In the following words, in place of the spelling combination *чн,* only *[шн]* is pronounced: *скучно – ску[шн]о, конечно – коне[шн]о, яичный – яи[шн]ый, яичница – яи[шн’]ица,*

пустячный – пустя[шн]ый, скворечник – скворе[шн’]ик, прачечная – праче[шн]ая, горчичный – горчи[шн]ый, подсвечник – подсве[шн’]ик, а также в женских отчествах типа Саввична – Савви[шн]а, Ильинична – Ильини[шн]а.

As a rule, the combination *[шн]* is also pronounced in words included in phraseological expressions. For example: *шапочное (шапо[шн]ое) знакомство, перечница – пере[шн]ица.* In some cases, in place of the spelling combination *чн*, pronunciation *[шн]* along with *[чн]* is acceptable,, for example: *двоечник – двое[ч’н’]ик, двое[шн’]ик, порядочный – порядо[ч’н]ый, порядо[шн]ый, сливочное – сливо[ч’н]ое, сливо[шн]ое.*

Pronunciation *[чн]* or [шн] can be a differentiating feature that distinguishes the meanings of words.Compare:*серде[ч’н]ые болезни – серде[шн]ый друг.*

A double consonant is usually pronounced in the middle of a word in a position after a stressed vowel: *гру[п]а, тра[с]а.* At the end of a word, double consonants, as a rule, are not pronounced *(криста[л], мета[л]).*

In the modern written literary Uzbek language, there are 6 vowels - (и), (э), (а), (о), (у), (ў) *and 25 consonants*, their composition is significantly different from the phonemes of the Russian language- [б], [д], [ф], [г], [х], [ж], [ж,], [к], [л], [м], [н], [п], [қ], [р], [с], [т], [в], [х], [й], [з], [ғ], [ш], [ч], (ц),[нг].

Depending on the place of foundation, consonants are distinguished in the Uzbek language:

1) Labial,

2) Lingual (front-lingual, middle-lingual, back-lingual, deep back-lingual).

By the way of foundation, the Uzbek language has explosive:

1) Clean explosive,

2) Compound explosive,

3) Slit,

4) Explosive-slit (nasal, lateral, trembling)

According to the participation of voice and noise, noisy ones are distinguished:

3) Voiced

4) Soundless

5) Sonorous (voiced)[5]

Characteristic of each consonant separately:

(б – б’) - Consonant, noisy, voiced, occlusive, labial, has pairs for voiceless and softness, eg: *бозор (б) – бадан (б’),*

(в – в’) - Consonant, noisy, voiced, slit, hard sound, labiodental and soft - labial, has pairs for voiceless and softness, eg: *вақт (в) – вакил (в’)*[6]

(г – г’) - Consonant, noisy, voiced, occlusive, back-lingual, paired in voiceless and softness, eg: *педагог (г) – гап (г’).*

(д – д’) - Consonant, noisy, voiced, occlusive, front-lingual, dental, paired for voiceless and softness, eg: *достон (д) – давлат (д’),*

(ж – ж’)- Consonant, noisy, voiced, affricate, slit, front-lingual, palatine-dental, eg: *журналист (ж) – жараён (ж’),*

(з – з’) - Consonant, noisy, voiced, slit, front-lingual, dental, paired for voiceless and softness, eg:*зўр (з) – зийрак (з’),*

(п – п’) - Consonant, noisy, voiceless, occlusive, labial, has a pair in voicing and softness, eg: *пойабзал (п) – панжа (п’),*

(ф – ф’) - Consonant, noisy, voiceless, slit, labial, has pairs in voicing and softness, eg: *фойда (ф) – фан (ф’),*

(к – к’)- Consonant, noisy, voiceless, occlusive, back-lingual, has pairs in voicing and softness, eg:*қўпол (қ) – китоб (к’),*

(т–т’) - Consonant, noisy, voiceless, occlusive, front-lingual, dental, paired in voicing and softness, eg: *тўқсон (т) – тарбия (т’),*

(с – с’)- Consonant, noisy, voiceless, slit, has pairs in voicing and softness, eg: сўроқ (с) – сўз (с’),

(ш – ш’)- Consonant, noisy, voiceless, slit, front-lingual, palatine-dental, has pairs in voicing and softness, eg: *шўрва (ш) – шанба (ш’),*

(ҳ – х’)- Consonant, voiceless, noisy, slit (fricative), back-lingual, has a pair of softness, eg: *ҳўроз (петух) (ҳ) – хал (мечта) (х’),*

(ц)- Consonant, voiceless, affricate (occlusive-slit), front-lingual, dental, has no pair, eg: *цирк, цензура (ц),*

(ч’) - Consonant, voiceless, affricate (occlusive-slit), anterolingual, palatine-dental, eg: *чилдирма (ч’),*

(л – л’) - Consonant, sonorous, occlusive-anadromous, lateral, has a pair of softness, eg:*луғат (л) – лайлак (л’)*[7]

(м – м’) - Consonant, sonorous, occlusive-passable, nasal, labial, has a pair of softness, eg: *пуфламоқ (м) – менда (м’),*

(н – н’) - Consonant, sonorous, voiced, occlusive-anadromous, nasal, front-lingual, dental, has a pair of softness, eg: *нусха (н) – навбат (н’),*
(р – р’) - consonant, sonorous, trembling, front-lingual, palatine-dental, has a pair of softness, eg: *рўмол (р) – разм (р’),*[8]
(нг) - consonant, noisy, voiced, unpaired soft, sonorous, middle-lingual, fricative, eg:*бодринг (нг) ,*

(ғ) - consonant, voiced, unpaired, noisy, fricative, deep-lingual, nasal, more posterior, eg: ғазаб, ғалла (ғ).[9]

The Russian language, to a greater extent than the Uzbek language, is characterized by the accumulation of consonants at the beginning of a syllable and at the end of a syllable.

Many active organs of speech: lips, lower jaw, tongue, palatine curtain, vocal cords - work more when speaking Uzbek than when speaking Russian.

Acoustic differences of consonants are generated by their articulation. The phonetics of one language, as a rule, are not similar to the phonetics of other languages. Therefore, the very sounding speech, as it were, separates one sound from another.

Uzbek consonants do not have a sign of softness and hardness. The loss of consonants in consonant groups is characteristic of colloquial speech and vernacular in the Uzbek language, as well as literary speech in Russian.

Phonetics of the Khorezm dialect

Let's consider the characteristics of each consonant sound of the Khorezm dialect.

There are 32 consonants in the Khorezm dialect.

[б - б’] - Consonant, voiced, noisy, occlusive, labial, paired on hardness and softness. And by voicedness - voisless,eg: *бол – (бал – асал); барак*

[в – в’] - Consonant, voiced, noisy, slit, labial - dental, paired in softness - hardness, eg:*вағырды – (вағырды–шовқин), важ (важ–буйум нарса)*[10]

[г’] - Consonant, voiced, noisy, plosive, back-lingual, unpaired in hardness, eg: *галди - (галди–келди).*

[д –д’] - Consonant, voiced, occlusive, front-lingual, dental, noisy, paired in voiced- and in hardness-softness, eg: *домбойин, дери- (дэри);*

[ж’] - Consonant, noisy, voiced, front-lingual, anterior palatal (apical) (the tip of the tongue, together with the back, rises to the upper teeth or alveoli), always soft (does not have a pair in hardness), eg: *жора , жаныққмоқ;*

[з – з’] - Consonant, noisy, voiced, noisy, slit (fricative), front-lingual, has a pair for voiceless and for softness-hardness, eg: зоволо (завала - зувала), (зар – захар);

[й’] - Consonant, voiced, sonorous, unpaired, always soft,eg: *йул – йўриқ* ;

[қ – к’] - Consonant, noisy, voiceless, occlusive, back-lingual, has a pair in voicing and softness, eg:*қазық (казык - қозиқ) ; кавап - (ковоп – кабоб);*

[л–л’]- Consonant, voiced, sonorous, occlusive-passable, lateral, front-lingual, dental; has a pair of hardness-softness,eg: *лотра, лаппик;*[11]

[м–м’] - Consonant, voiced, sonorous, occlusive-passable, nasal, paired in hardness and softness, eg:*манқа, масси, мейир ;*

[н–н’] - Consonant, sonorous, occlusive, nasal, has a pair of hardness-softness, front-lingual, dental,eg:*назвай, нера;*

[п–п’] - Consonant, sonorous, occlusive, nasal, has a pair of hardness-softness, front-lingual, dental,eg:пайыр, питта;

[р – р’] - Consonant, sonorous, trembling, front-lingual, palatine-dentsl, unpaired, eg: *ропак, ружжа;*

[с–с’] - Consonant, voiceless, slit, front lingual, dental, has pairs in voicing and hardness-softness eg: *сағат, сас;*

[т– т’]- Consonant, noisy, voiceless, occlusive, front-lingual, dental, has pairs in voicing and hardness - softness eg: *тавақ , тейип;*

[х–х’] - Consonant, noisy, voiceless, slit, back-lingual, has a pair in sonority and hardness-softness eg: *хавандар, хинжи;*[12]

[ч’] - Consonant, noisy, voiceless, affricate (occlusive-slit), front-lingual, palatine-dental, soft, unpaired, always soft, eg: *чолур;*

[ш – ш’] - Consonant, noisy, voisless, front-lingual, palatine-dentaleg: *шағал, шарава.*

The consonants [қ], [ғ], [ҳ] of both the Uzbek language and the Khorezm dialect have no analogues in Russian.

The sound [қ] is a voiceless, occlusive, posterior palate, formed by closing the very back of the back of the tongue with the soft palate: *қator - "row", qishloқ* .

Replacing the sounds [қ] and [k] can lead to distortion of the lexical meaning of the word.

The sound [ғ] is a voiced, slit, formed by bringing the very back of the tongue closer to the soft palate, eg: *ғайр, боғ, беғайрат*.

The sound [х] is a voiceless, slit, formed by the convergence of the walls of the pharynx in its lower part. The sound [х] for example *(ҳазатмоқ)*. The sound [х] differs from the Russian sound [х], since it is formed deeper (just like the sound [ғ], but without the participation of the voice).

The sound [л] by ear can be taken as an average between the Russian hard [л] and soft [л'], for example, *лақалақ, лаппик*. When the Khorezmian [л] is formed, the front part of the back of the tongue closes with the hard palate, and touches the front upper teeth eg: *ликув, ликки.*[13]

Voiced consonants *[б], [д],* unlike similar Russian consonants at the end of a word are stunned slightly, for example: (од), бод.

The rest of the consonants of the Khorezm dialect do not differ significantly from similar sounds of the Uzbek language.

Investigating the phonetic side of the Khorezm dialect on the basis of an explanatory dictionary, during the study, the following final consonant combinations at the end of a word, stunning voiced consonants were identified:

б-п-галиб (галип) ,

в-ф- ақлов (аклоф),

г-й – эг (эк)

д–т- ад (ат)

з-с – дуз - (дус)

ж–ч- авж – (авч)

з-с –аз-(ас)

Sounds remain unchanged in the following positions, for example:

с-с - палпис,

й-й - буғдой,

к - к –ак,

қ – қ - айақ,

л- л - ал,

н – н - э:ван,

р – р - жўвр,

с - с - камис,

т– т - тут,

х–х- гулмиҳ,

ҳ-ҳ – воҳ -воҳ,

ч–ч-каруҷ,

ш- ш - тырқыш;[14]

The phonetic differences between the consonant sounds of the Oghuz dialect and the literary Uzbek language are as follows:

a) at the beginning of the word, instead of the sounds "к", are pronounced"г"*(гал)* - *кел*, instead of *"т"* - *"д"(дил)* - *тил*, *instead тиш — диш*, *кел — гал (гел)*, *керак — гарак (гарак);*

b) *"қ", "ғ", "к", "г"* at the end of the word are omitted: *иссиқ — (исси)*, *тирик — (дири), гоҳо – (гавах).*

c) in the forms of local and original cases of words in the form of belonging to the third person, the sound*"н"* is added before the case affix: *ичинда*, *дишинда;*

d) The letter*"нг"* is pronounced in two forms, like "нг" and "ң": китопиңг, гийиминг;

e) Voicing of anlaut к, т: гу:з; да:л ; да’па ;

e) Falling away of the final *“к”, “қ”*: катты; аджы;[15]

In the Uzbek language, as a rule, consonants alternate with vowels. Therefore, the pronunciation of Russian words in which there are several consonants in a row can cause difficulties.

For example, Uzbek and Khorezm students make mistakes in reading, pronunciation and writing at the junction of two consonants eg: *на улицах - (на улитсах, на улитицах, на улитцах), листьями (лисиями, лисьсиями), осенний (осенни,осеньны, в осеньный).*

It is very important to learn how to pronounce such words correctly, without adding vowels both at the beginning of a word and between consonants.

Some Russian consonants like (ц) are read and written by doubling them, eg: *в центре - (в тсентре), спотыкаться (спотикаца).*

I would like to pay special attention to the**ь** and**ъ** signs of the Russian language instead the word*грязь*, the Uzbek-speaking audience writes - (грьяз, гряз), сильный – (силний), земля- (земьлья, земьля)

Foreign words, as they are mastered by the Russian language, lose the length of the consonants and are pronounced as sounds of ordinary longitude *(то[н]ель, те[р]аса, ко[р]ектор, ко[м]ерция).*

The pronunciation of each word can be checked in the book “Russian literary pronunciation and stress. Dictionary-reference book ", edited by R.I. Avanesov and S.I. Ozhegov. - M., 1959.

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THE ROLE AND IMPORTANCE OF THE DEVELOPMENT OF THE SERVICE SECTOR IN THE SOCIO-ECONOMIC DEVELOPMENT OF THE COUNTRY

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ABSTRACT

This article examines the specifics of the development of the service sector and its role and importance in the socio-economic development of the country. In the process of diversification of the economy and modernization of the most important sectors of the country, the sustainable economic development of service enterprises in the context of constantly changing market relations requires improving the organizational and economic mechanism to increase the efficiency of their economic activities. Because ensuring the intensity of services associated with the organizational and economic mechanism for improving the efficiency of service enterprises to achieve savings in the use of resources; increase the efficiency of employee use and quality of service and its efficiency; the issue of full satisfaction of consumer demand is one of the specific problems of the industry.

KEYWORDS: *Service, Service Economy, Economic Efficiency, Human Capital, Division Of Labor.*

INTRODUCTION

According to the essence and content of the service sector, it includes various forms and directions of human activity related to the creation of conditions for human capital development and the transition to a relatively high level of division of labor, related to ensuring modern quality of life.

In the process of diversification of the economy and modernization of the most important sectors of the country, the sustainable economic development of service enterprises in the context of constantly changing market relations requires improving the organizational and economic mechanism to increase the efficiency of their economic activities. Because ensuring the intensity of services associated with the organizational and economic mechanism for improving the efficiency of service enterprises to achieve savings in the use of resources; increase the efficiency of employee use and quality of service and its efficiency; the issue of full satisfaction of consumer demand is one of the specific problems of the industry. One of the main tasks today

is to increase the level and quality of services of local enterprises in the international market and increase exports of services on this basis.

In the current era of the spread of new information technologies, the development of the world community has reached such a stage that it is changing, showing its impact on all aspects of socio-economic life. Such changes in socio-economic life are recognized by economists in such a way that it is marked by the fact that the development of human civilization has entered a new stage. According to them, at this stage of civilization, the decisive factor is the knowledge and skills of people and information.

THE MAIN FINDINGS AND RESULTS

The development trend of modern society is mainly characterized by the transition from a raw materials and industrial economy to a service economy. The main focus is on the development of modern networks with a large capacity of science and information technology in the use of intellectual resources. Such a situation in the development of society requires a wider development of the service sector than other sectors of the economy.

The scientific and technological revolution of the 1950s led to a qualitative change in the productive forces, a radical renewal of the material and technical base of production and a deepening of the international division of labor. As a result, since the 1970s, the number of people employed in the service sector of the developed market economies has increased. In the service economy, knowledge and information are important as a key factor in production.

At the present time, the socio-economic development of the countries of the world differs sharply from the previous stages in terms of its meaning and content. New interpretations of economic growth require modern, conceptual approaches to the science of world economics. In particular, effective activity in the service economy has been studied more extensively than industrial activity, which is primarily explained by the fact that socially oriented activity is aimed at ensuring the living standards and quality of life in society.

In the context of effective activity, characterized by the establishment of a service economy, the following can be distinguished:

1. In the service economy, businesses focus primarily on increasing efficiency, ie more fully meeting the specific (special) needs of customers. In an industrial economy, the focus is more on maximizing the production of goods.

2. The concept of utility in the service economy is the same as the nature of the use of goods, which determines the degree of improvement of the system of material goods and services. In an industrial economy, only the material side of the product is taken into account.

3. In the service economy is understood the ability to constantly monitor and determine the attitude of the manufacturer to the maximum satisfaction of the consumer on the basis of quality. In an industrial economy, on the basis of quality, only the ability of the operator to “do his job well” is understood.

4. The management system in the service economy is also changing. While its main features are flexibility, quick decision-making, organization, freedom of movement and transparency, in industrial economics management is characterized by a “mechanical” nature, i.e. the hierarchy of structures and their excessive regulation.

5. In the service economy, the focus is on the efficiency of the service system, while in the industrial economy, the focus is on the transformation of raw materials into finished products.

From the above, it can be concluded that effective activity in the service economy differs from effective activity in the traditional (industrial) economy, and it is more socially oriented.

Therefore, the development of the service economy in countries based on developed market economies leads to a new understanding of socio-economic development. In particular, not only the rate of quantitative growth, but also social indicators, indicators of quality of life plays a key role in it. In such an environment, effective activity is defined as meeting the needs of members of society, primarily socially oriented goals. In an industrial economy, there are more quantitative, economic, and priority goals.

CONCLUSION

In general, considering the theoretical foundations of the service economy, it should be noted that the changes in economic conditions in developed market economies require a broader category of effective activities. A new approach to the category of efficiency is becoming increasingly popular in foreign economics. This approach emphasizes that results can be achieved qualitatively rather than purely quantitative in terms of the content of effective activities.

Economic efficiency reflects the results of the activities of entrepreneurs, while social efficiency reflects the social efficiency of economic entities, its impact on various aspects of society. At the same time, social and economic efficiency are to some extent interdependent. Achieving social efficiency is the improvement of people's social living conditions, which makes it possible to increase economic efficiency. As a result, it affects a person’s ability to work, leading to an increase in his or her labor productivity. At the same time, a material basis is needed for the implementation of social programs. This material basis is achieved by increasing the economic efficiency of enterprises. Hence, the new content of effective activity in the conditions of service economy can be expressed as follows: activity efficiency is not measured by the essence or content of the concept of efficiency, but by indicators that constitute social efficiency. These indicators have a broader meaning than the indicators that determine economic efficiency. Changes in the qualitative conditions that constitute efficiency make it necessary to assess the effectiveness of business entities. At the same time, it is generally accepted that social efficiency cannot be reduced to a precise quantitative measure. Thus, traditionally, efficiency can only reflect its economic nature, making it difficult to measure its social and socio-economic aspects by quantitative criteria. This view is widespread in the economic sciences today. At the same time, research related to the solution of the problem of performance appraisal in the service economy is becoming more relevant, and the demand for research in this area, in our opinion, is much higher.

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THE IMPORTANCE OF USING PEDAGOGICAL TECHNOLOGIES IN THE CLASSROOM

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ABSTRACT

The teacher uses pedagogical technologies, educational technology, teaching technology in the process of quality organization of teaching processes and attracting students to the lesson. "Advanced pedagogical technology", "modern educational technology" are still not standardized, not explained in encyclopedias, no single interpretation of its content has been developed, and therefore many different terms reefs are available.

KEYWORDS: *Technology, Educational Innovation, Pedagogical, New Pedagogical Technology, Modern Educational Technology, Advanced Pedagogical Technology.*

INTRODUCTION

All levels of the education system in the country are provided with new scientific literature. They are innovating in their work based on the requirements for educators. In the process of educating the younger generation, along with the use of science, technology and best practices, modern pedagogical technologies are effectively used. This process increases the responsibility of teachers. What is pedagogical technology? How and where can we use it effectively? To answer such questions, do we first need to study the teaching process, the teacher and the student? Lessons are the collaborative, productive work of a teacher and a student. Positive organization of the lesson, effective use of time, the right choice of lesson objectives, the ability to apply the methods in place, to create a positive-emotional environment in the classroom by cooperating with students is the main activity. Teaching students to read, to help students acquire knowledge independently from teaching, and to understand and apply modern pedagogical technologies in a variety of ways to achieve a positive outcome in the classroom requires skill on the part of the educator. The learning process consists of three parts.[1]

-Motivation;

-Cognitive activity;

-Management activities.

When these three components work together, results can be achieved in pedagogical technology. Classes based on pedagogical technology allow students to express their views on important life achievements and problems, to think, to justify their views. The most fundamental foundation of pedagogical technology depends on the technologies chosen by the teacher and the student to

achieve a systematic, collaborative approach based on a clear sequence of guaranteed results from the set goal. The main features of pedagogical technology are design, implementation and guaranteed results. The teacher is responsible for the development of the lesson plan, technological mapping, purposeful implementation and achievement of results. The role and importance of innovative methods in the use of pedagogical technologies is great. The main purpose of interactive methods is to motivate students to be active, to involve them in the lessons, to teach them to work together.[2]

Interactive or Interactive Methods

Relation of educational content to interactive methods. Thus, we have described a holistic approach that identifies the first important condition for improving the choice of teaching methods in relation to their systematization, their application in the practice of planning processes of the learning process. Criteria for the selection of traditional methods in pedagogy have been developed in large numbers, and in recent years in the works of didactic scholars more than twenty of them are cited.

The criterion for choosing interactive methods is that they are highly focused on solving problems in the development of education and upbringing. This criterion is introduced by assessing the ability of different methods to solve problems in one area or another, as their ability to master the elements of social experience varies. The next criterion for choosing interactive methods is their relevance to the nature of the content. The content of the method is also defined as part of the movement. There is no doubt that this criterion will be taken into account from this bus. One method reveals the content of the topic in more detail, while the other allows you to master it positively. Another criterion for choosing interactive methods is that they are fully compatible with the learning opportunities of students, that is, to ensure the unity of internal and external conditions for effective learning activities. The use of interactive teaching methods should be tailored to the individual capabilities of the educator. The next criterion for choosing interactive methods is their compatibility with the forms of organization of the learning process. By the way, general, group and individual forms of teaching require different methods. the participation of all students in the group will be required. Compliance with the principles of pedagogical technology of interactive methods is a generalizing criterion. Based on the general purpose of education, the allocated option is analyzed and evaluated, taking into account the need to address educational and developmental issues at the current stage of teaching. One of the important requirements for the organization of modern education is to achieve high results in a short time without excessive mental and physical effort. formation, as well as monitoring the activities of students, the assessment of the level of knowledge, skills, competencies acquired by them requires from the teacher high pedagogical skills and a new approach to the educational process. Pedagogical technology is inherently subjective, which means that every educator must organize the process of education and upbringing creatively, based on their abilities and professional skills. Regardless of the form, method and means of organization, pedagogical technologies:

-Increasing the effectiveness of pedagogical activities;

-Decision of interaction between teachers and students;

- Ensuring that students acquire a thorough knowledge of the subject;

-Development of independent, free and creative thinking skills in students;

-Create the necessary conditions for students to realize their potential;

The method of “intellectual attack” is to ensure the activity of students in the classroom, to encourage them to think freely and free them from the inertia of the same thinking, to collect a

variety of ideas on a particular topic, as well as to solve creative tasks. serves to teach them to overcome the ideas that arise in the early stages of the maturation process. The method of "brainstorming" was recommended by A.F.Osborn the main principle and condition of which is to strictly prohibit criticism of the idea expressed by each participant in the training, to encourage any bites and jokes. The aim is to ensure the free participation of students in the learning process. The effective and successful use of this method in the educational process depends on the pedagogical skills of the teacher and the breadth of thinking. When using the method of "brainstorming" it is advisable not to exceed 15 students. Classes based on this method can last up to an hour.[3]

Interactive methods are called collective thinking, that is, methods of pedagogical influence are an integral part of the content of education. The peculiarity of these methods is that they are carried out only through the joint work of teachers and students.

The benefits of a student-centered approach

The purpose of independent work of students is to organize a systematic study of disciplines during the semester, to strengthen and deepen the acquired knowledge and skills, to prepare for the next lessons, to form independence and a culture of intellectual labor in the search for new knowledge. The time allotted for it is determined by the working curriculum and can be 30-60% of the total number of study hours allocated to the student for the study of a particular subject. Each studied subject is divided into a number of thematic sections, and for each of them are identified all important types of classes, tasks for independent theoretical and practical work, educational and scientific literature, sources of statistical data, etc. The student reports in the prescribed manner on the completion of the tasks of each department. All the work done by the student is evaluated on the basis of criteria developed and approved by the department. A student who does not get enough points in each independent work is considered to have not mastered the relevant subject. Students' independent work, depending on their characteristics, can be as follows. Reproductive independent work - reading, summarizing textbooks, listening to lectures, narration, memorization, repetition of educational material, etc.

Self-seeking independent work in practical and seminar classes with presentations and lectures, selection of literature on the curriculum, writing course and control works, etc. Creative independent work - writing abstracts and scientific articles, participation in research work, preparation for graduate work, special creative assignments, etc. develop technological maps for the organization of training, which include independent work, their capacity, labor capacity, forms of control. Technological maps to be developed for each topic of the training course include the main questions of the report, practical and seminar classes, a list of necessary literature. Published documents, a set of visual aids (drawings, graphs, slides, etc.) are distributed in advance to the study groups and are an important organizational part of the learning process. Depending on the level of students' ability to work independently, from the first semester to increase the volume of independent work semester-semester, the transition from simple to more complex tasks (active participation in practical classes, essays, course work, graduate work), independent work It is advisable to expand the forms. The teacher must always increase the creative approach to the independent work of the student and actively add to the chosen form of independent work the general elements of research, practical experience. The main task here is to strengthen the independent learning of each student. The teacher must always lead the independent work, not to allow arbitrariness in its organization, to implement the established control system and to provide objective assistance to students at all stages of learning.

Technology (Greek: "techno" - profession, master and "logos" - science, education) - methods of converting raw materials into finished products on the basis of scientific practice. Technology (Greek techne - art, skill, learning and ... logy) - a system that regulates the methods of obtaining,

processing and processing products in industry, construction, transport, agriculture and other areas; a science that deals with the development, introduction, and improvement of these methods. Each industry has its own technology: mining technology, mechanical engineering, construction technology, agricultural technology, and more.

Methods of ensuring the continuity and continuity of communication techniques and strategies.

The main reason why a person is called a product of social relations is that he is always in the circle of people, in the sphere of interaction with them. This indicates that one of the most leading and influential activities of an individual is communication. The type and forms of communication vary. For example, this activity can be directly “face-to-face” or by one or another technical means (telephone, telegraph, etc.); be practical or friendly in the course of a professional activity; can be subject-subject type (dialogic, partnership) or subject-object (monologue). Human relationships are processes of interaction in which interpersonal relationships are formed and manifested. Such a process involves the exchange of thoughts, feelings, worries, and joys that initially occur between people. As people communicate, as they experience the relationship between them, they develop qualities such as commonality, similarity, and harmony that make them understand each other at a glance, or even “half-heartedly.” In some cases, the intensity of such communication leads to the opposite reactions - fatigue, lack of speech. For example, the family environment and the relationships within it are such close relationships. Only such a density can occur not only among all members of the family, but also among individual members (mother - child, mother-in-law - daughter-in-law and x-zo). The main goals of the parties to the relationship are to find common ground and understand each other. The complexity of this process, if necessary, the "charm", the uniqueness of which is that it is impossible to find common ground or think and speak exactly the same. If we imagine such a situation, such a dialogue would be the most ineffective, the most ineffective. As we live in the 21st century, man's need for the most natural communication, his desire to be aware of his secrets and to be able to effectively influence others, has increased, and there are a number of reasons for this. First, we are moving from an industrial society to an information society. The abundance of information necessitated the sorting of information related to the interests of man, the right relationship with him. Information has become the rarest asset in the 21st century, which in turn changes the speed and pace of transmission of information to people. Second, the growing number of groups of people working in different professions, the urgency of the relationship between them requires not only simple communication in a tight information environment, but also professional, knowledge-based communication.

In general, economists, who predict that the XXI century will be the century of corporations, also say that this corporation is a well-developed, perfect skills for people to find common ground.[4]

In addition, such corporate communication often involves the transmission of clear and concise ideas, not directly face to face, but using modern technical means - mobile communication, faxes, e-mail, Internet, etc. This also requires the deliberate formation of specific communication skills.

Third, the number of professions has recently increased, which are called sostionomic group professions, in which the “man-to-man” dialogue determines the effectiveness of the activity. For example, pedagogical activity, management system, various services, marketing, etc. In such circumstances, the deliberate increase in people’s communication skills determines the product of labor. Therefore, the role and potential of the sciences in the field of communication, its nature, techniques and strategies, teaching communication (social psychological training) in society has increased dramatically. G.M.Andreeva In the book “Social Psychology” suggests the following structure:

1. The communicative side of communication, ie as a process of interaction or exchange of information between the parties to the communication;

2. The interactive side of communication, ie as a process of influencing the behavior of the interlocutors;

3. The perspective side of communication, that is, as a process related to the perception and understanding of each other by the interlocutors. B.F Parigin writes about the psychological complexity of communication in relationships:

“Communication is such a multifaceted process that it involves:

A) The process of interaction of individuals;

B) The process of information exchange between individuals;

C) The process by which one person treats another;

G) The process by which one person influences others;

D) The opportunity to empathize with each other;

E) The process of understanding each other.

Thus, while interpersonal relationships are the most complex and multifaceted of human activities, many studies by world psychologists in the field of social psychology have shown that this phenomenon is both necessary and simple for the individual. Looks mysterious.

Psychological Means of Human Behavior And Communication

As people interact with each other, one of their main goals is to influence each other, that is, to persuade each other, to motivate, to change attitudes, and so on. Is to make a good impression. Psychological influence is the ability to influence people's thoughts, feelings and actions through various means. In social psychology, there are three main means of psychological influence.

1. Verbal influence is the effect we make through words and speech. The main tools are words. It is known that speech is a conversation, a process of interaction, the means of which are words. In both monologue and dialogic speech, a person wants to use all his vocabulary to find the most effective words and influence his partner.

2. The paralinguistic effect is the factors that disturb, amplify, or weaken the speech surrounding speech. These include high or low speech, articulation, sounds, pauses, stuttering, coughing, tongue movements, and cries. So, for example, if a friend promises us something, we know how sincere he is. We believe, of course, that with a burning, open face and a bold voice, “I will do it!”

3. The meaning of nonverbal influence is “speechless”. These include the positions of the interlocutors in relation to each other in space, situations (near, far, intimate), gestures, facial expressions, pantomime, views, direct feelings, appearance, various signals (noise, smell). For example, if in the first minutes of a meeting your friend looks at you and looks around and says, “I am glad to see you,” do you believe it? The characteristic feature of the communication process is that when the interlocutors try to influence each other, they first think about what to say, what words to use. In fact, those words and the actions around them play an important role. For example, according to the famous American scientist Megrabian’s formula, the positive impressions of first-time interlocutors are positive for 7%, paralinguistic factors for 38%, and nonverbal actions for 58%.

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FAULT LOCATIONS IN UNDERGROUND CABLE USING DISCRETE WAVELET TRANSFORM AND SUPPORT VECTOR MACHINES ALGORITHM

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ABSTRACT

This paper offers a discrete-time method. Support vector machines (SVM) and wavelet transform (DWT) (SVM) for the purpose of locating a problem in an underground distribution cable Theta mimic fault signals, ATP/EMTP is utilized. The woman's mother the wavelet daubechies4 (db4) is used to decompose high-dimensional data. These signals have a frequency component. The maximum amount offing the first, the coefficient was derived from the positive sequence current's an input; a scale capable of detecting bus faults is employed. The training pattern's pattern. It is shown that the planned the method produces acceptable results and will be very helpful in the future. The creation of a power system protection plan.

KEYWORDS: *Wavelet Transform; Fault Location; Underground Distribution Cable; Support Vector Machines.*

1. INTRODUCTION

Several methods have been used in the literature to identify the fault position in underground cable, including age cable , Murry loop pulse radar, bridge technique, and travelling wave , however each methodology has its own set of solutions. The most successful method for locating faults is based on a traveling wave, and it was first suggested in the 1980s .For Type A and Type D modes, most studies have solely evaluated the fault site based on the traveling wave. Type A algorithms are one-end algorithms that utilize voltages and currents measured at one end of a line to estimate the distance to a defect. Type D algorithms are two-end algorithms that need both a precise technique of time synchronization and a simple way of getting the measurements from the two terminals to a common point in order to identify the fault site. The Type D mode is more precise than the Type A mode and it may reduce or eliminate the impacts of fault resistance, loading, and charging current. Discrete wavelet transform (DWT) [1]based on travelling wave has been used in earlier research to detect high frequency components and locate problem sites in the subterranean distribution system. The fastest two first peak times acquired from comparison are used as input data for travelling wave theory.Figure 1 discloses the system used in simulation studies[2]

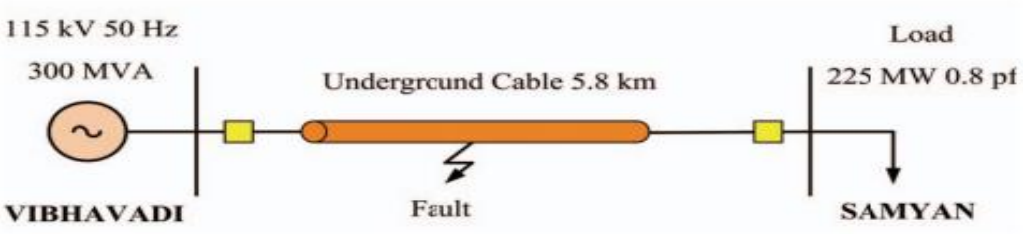

Figure 1: The system used in simulation studies

The first peak time that can identify fault collected from all buses is compared, and the fastest two first peak times obtained from comparison are utilized as input data for travelling wave theory. Although the accuracy of fault sites predicted by the travelling wave theory is excellent, the impact of changes in the traveling wave's propagation velocity cannot be overlooked. Artificial intelligence (AI) has also been used to locate faults in the literature .Although the artificial neural network method may provide accurate defect detection results, it is restricted in part by its sluggish training performance. A new algorithm has been created in order to solve this issue. If the problem sites in the subterranean cable can be detected using wavelet transform and support vector machines, it would be interesting to explore a suitable support vector machines method for inclusion in newly created protection systems.[3] As a result, the purpose of this article is to describe the creation of a novel decision algorithm for use in protective relays to identify fault location. ATP/EMTP is used to mimic fault situations. The DWT is then used to extract the current waveforms produced from the simulation. The support vector machines are used to build the decision algorithm. The suggested algorithm's validity is evaluated using a variety of fault origination angles, fault locations, and faulty phases. In addition, the decision algorithm's design is described in depth and illustrated using case studies based on Thailand's power transmission networks.

*1.1.*EMTP-Based Power System Simulation

At a sampling rate of 200 kHz, the ATP/EMTP is used to mimic fault signals. The system used in the case studies is based on the subterranean distribution system shown in Figure 1. In addition, a cross-sectional view of a cable. To keep things simple, the fault resistance is set to tenpin the simulations, fault patterns are created by changing system parameters as follows: - Fault types include single line to ground, double line to ground, line to line, and three-phase fault. - Fault sites range from 1 km to 5 km (each step equals 1 km) from the transmitting end of the subterranean cable. On the phase a voltage waveform, fault inception angles range from 0 to 150 degrees with a 30 degree step. Example of simulated fault signals using ATP/EMTP. Figure 1 depicts a fault that occurs with phase A to ground fault at a distance of 1 kilometer from the transmitting bus. For the fault detection method, the fault signals produced using ATP/EMTP are interfaced to MATLAB.Figure 2 discloses the configuration of cable in simulation studies[4].

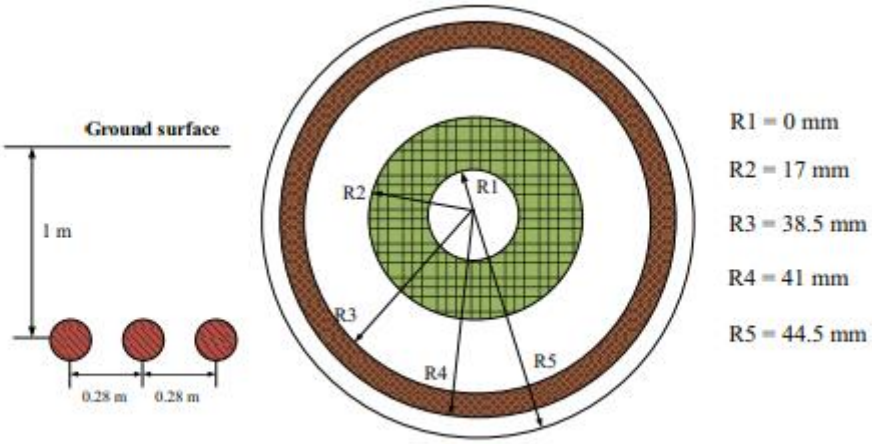

Figure 2: The Configuration of Cable in Simulation Studies.

Positive sequence current signal is used to execute the fault detection judgment method. To compute the positive and zero sequences of currents, the Clark's transformation matrix is used. The defect detection decision method based on computer programming approach is developed as illustrated in Figure 4 using many trial and error procedures. To decompose high frequency components from positive sequence current data, the mother wavelet daubechies4 (db4) is used. The comparison of the coefficients from each scale is being investigated after applying the DWT to the positive sequence currents. The coefficients acquired using DWT of signals are squared so that the rapid shift in the spectra can be clearly [5]observed and it can be seen that when a fault occurs, the coefficients of high frequency components have a sudden change compared to those before the fault occurs. This abrupt shift is utilized as a predictor of fault occurrence. If the coefficients of any scales are modified approximately five times before a fault occurs, the fault detection decision system predicts that faults will occur in subterranean cable. That in the prior fault situation, the coefficient detail (cD1) of positive sequence current is smaller than the coefficient detail (cD1) in the post fault condition. The coefficient detail (cD1) in each scale of the wavelet assumes that these signals represent fault conditions[6].

2. DISCUSSION

The result produced from the fault detection method may assume the normal state of these signals since the wavelet transform does not clearly alter as. As a consequence, the fault detection algorithm assumes that "if coefficients of any scale are altered about five times before a fault occurs, there are faults happening in subterranean cable, and the coefficients in the first scale that may identify fault is examined.

*2.1.*Application:

DWT is applied to the quarter cycle of voltage and current waveforms following the fault initiation using the simulated signals. For SVM, the coefficients of scale 1 computed using the DWT are utilized. The fundamental concept behind SVM is to use a kernel function to transfer the training data from the input space into a higher dimensional feature space. The optimum hyper plane in this feature space is found to optimize the classifier's generalization capabilities The input data is standardized and split into 300 sets for training and 150 sets for testing before the training process begins. The support vector machines include two inputs, five SVM models, and a single output. As shown in Figure 7, the input patterns are maximum coefficients in the first scale of the positive sequence current at 14 cycle for post-fault currents. The support vector machines' output variables are labeled with a value range of 1 to 15, which corresponds to different fault sites as indicated in Table I.SVM model types SVM's outputThe distance between

the transmitting and receiving ends is measured (km) Five SVM models are examined throughout the training process, and each model includes two fault sites, as indicated in Table I. Only the output is allowed as distance of fault or other fault location for each SVM model because the modified parameters with the lowest error are chosen as the most suitable parameters. Case studies are varied after the training procedure to verify the decision algorithm's capacity. A total of 150 case studies are available[7]. Different case studies with various kinds of faults are carried out, including variations in fault initiation angles and positions in underground cable. Table II also shows the results of a comparison of average error between a decision algorithm based on the suggested 91 method and a decision algorithm based on Apisit et al's DWT based on travelling wave theory. It can be observed that the algorithm's prediction of fault sites is very accurate. This is an improvement above the fault location identified by Apisit et al using the travelling wave hypothesis.Figure 3 discloses the Configuration of Cable in Simulation Studies.

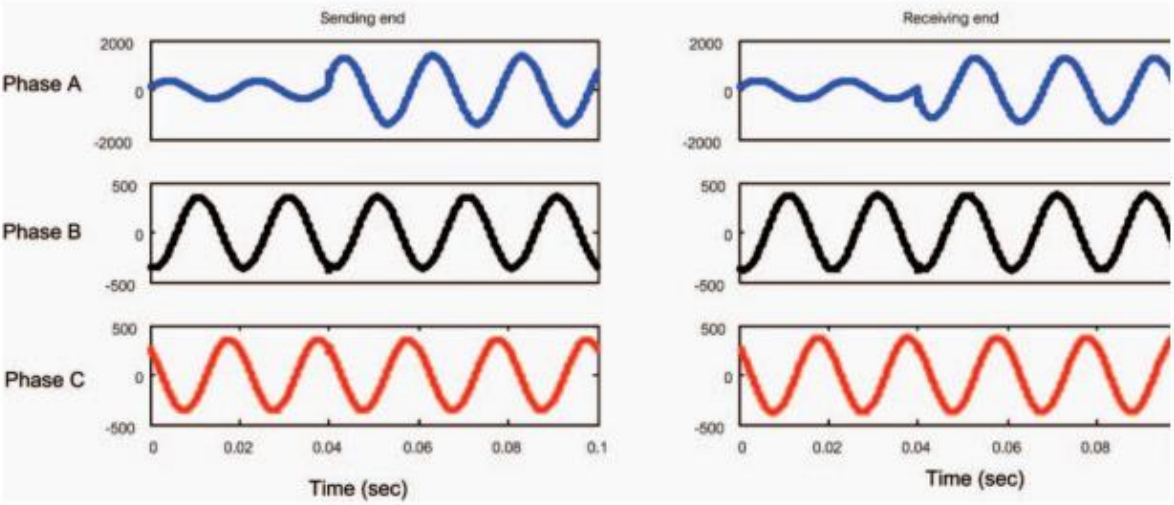

Figure 3: The Configuration of Cable in Simulation Studies.

Support-vector machines (SVMs, also known as support-vector networks) are supervised learning models that evaluate data for classification and regression analysis in machine learning. Vladimir Vapnik and colleagues at AT&T Bell Laboratories developed it (Boser et al., 1992, Guyon et al., 1993, Vapnik et al., 1997[8] SVMs, which are based on statistical learning frameworks or VC theory developed by Vapnik (1982, 1995) and Chervonenkis, are one of the most reliable prediction techniques (1974). An SVM training algorithm creates a model that assigns new instances to one of two categories, making it a non-probabilistic binary linear classifier, given a collection of training examples, each marked as belonging to one of two categories (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting). SVM translates training examples to points in space in order to widen the distance between the two categories as much as possible. New instances are then mapped into the same space and classified according to which side of the gap they land on.SVMs may do non-linear classification as well as linear classification by implicitly translating their inputs into high-dimensional feature spaces, which is known as the kernel trick.When data is unlabeled, supervised learning is impossible, therefore an unsupervised learning method is needed, in which the data is clustered naturally into groups and new data is mapped to these groups. The support-vector clustering method was developed by HavaSiegelmann and Vladimir Vapnik to classify unlabeled data using support vector statistics generated in the support vector machines algorithm. It is one of the most frequently used clustering algorithms in industrial applications. In machine learning, classifying data is a frequent job. Assume that certain data points are assigned to one of

two classes, and the objective is to determine which class a new data point will be assigned to. A data point is regarded as a displaystyle pp-dimensional vector (a list of displaystyle pp numbers) in support-vector machines, and we want to know whether we can separate such points using a displaystyle (p-1)(p-1)-dimensional hyperplane. A linear classifier is what this is termed. There are many hyperplanes that may be used to categorize the data. The hyperplane that indicates the greatest separation, or margin, between the two classes is a plausible option as the best hyperplane. As a result, we select the hyperplane to maximize the distance between it and the closest data point on each side. If such a hyperplane exists, it is referred to as a maximum-margin hyperplane, and the linear classifier it creates is referred to as a maximum-margin classifier; or, more simply, the perceptron of optimum stability. A support-vector machine, in more technical terms, creates a hyperplane or collection of hyperplanes in a high- or infinite-dimensional space that may be used for classification, regression, or other tasks such as outlier identification. Intuitively, the hyperplane with the greatest distance to the closest training-data point of any class (so-called functional margin) achieves a decent separation, since the bigger the margin, the lower the classifier's generalization error. Even though the initial issue is expressed in a finite-dimensional space, the sets to discriminate are often not linearly separable in that space. As a result, it was suggested that the original finite-dimensional space be transferred onto a much higher-dimensional region, supposedly making separation simpler there. The mappings used by SVM schemes are designed to ensure that dot products of pairs of input data vectors can be computed easily in terms of the variables in the original space, by defining them in terms of a kernel function displaystyle k(x,y)displaystyle k [9][n higher-dimensional space, hyperplanes are defined as a collection of points whose dot product with a vector in that space is constant, where such a set of vectors is an orthogonal (and therefore minimum) set of vectors. The hyperplanes' vectors may be selected as linear combinations with parameters displaystyle alpha _ialpha I of pictures of feature vectors displaystyle x ix i that appear in the data base. The relation displaystyletexstyle sum _ialpha _ik(x i,x)=text constant defines the points xx in the feature space that are mapped into the hyperplane with this choice of a hyperplane. Displaystyletexstyle sum _ialpha _ik(x i,x)=textconstant.displaystyle textiles sum _ialpha _ik(x i,x)=text constant. Each term in the sum measures the degree of closeness of the test point displaystyle xx to the corresponding data base point displaystyle x ix i. If displaystyle k(x,y) becomes small as displaystyleyy grows further away from displaystyle xx, each term in the sum measures the degree of closeness of the test point displaystyle xx to the corresponding data base point displaystyle x ix i. In this manner, the sum of kernels above may be used to calculate the distance between each test point and the data points originating in one of the discrimination sets.

3. CONCLUSION

The method described in this article is based on aTo find faults, a mix of DWT and SVM algorithms is used. The cable's subterranean placement db4 (Daubechies 4) is a db4 (Daubechies 4) visas a mother wavelet, you've been chosen. The DWT has been put to use. To split fault signals into high frequency components in defect detection, positive sequence current signals are utilized. The highest DWT values during the 14th positive cycleAs an example, the sequence for post-fault current waveforms is utilized. Input for the SVM decision-making training procedure algorithm. The average error from the two groups was compared. The method presented in this article produces the following results: Table II shows the findings, which clearly indicate that the newIn terms of forecasting the future; an algorithm may offer a higher performance. Locations of faults with an average inaccuracy of 0 km[10]

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FAULT DETECTION USING ELECTROMAGNETIC TIME REVERSAL: THE PROBLEM OF LOSSES

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ABSTRACT

The issue of fault finding in AC and DC power networks has recently been addressed using electromagnetic time reversal (EMTR). The impact of losses on the use of EMTR to detect faults is examined in this study. Three back propagation models are presented and explored. Even though the telegrapher's equations are not precisely time-reversal invariant in this instance, we demonstrate that a back-propagation model with losses results in a flawless estimate of the fault site.

KEYWORDS:*Electromagnetic Time Reversal (Emtr); Fault Location; Transmission Line; Telegrapher's Equations*.

1. INTRODUCTION

In order to enhance power supply dependability and decrease restoration time and costs, secure power system operation need precise and fast problem identification techniques. Locating faults along transmission lines is a serious issue in power systems and EMC that has been studied extensively since the 1950s .Many fault finding techniques have been suggested in the literature, but they always fall into one of two [1]types I impedance-based methods or (ii) travelling wave-based approaches. The fault localization accuracy may be influenced by fault impedance, power system load flow, dispersed generators, and series compensation, despite the fact that impedance-based techniques are simpler and computationally efficient. When compared to impedance-based techniques, travelling wave-based methods may offer more accurate and reliable findings. These techniques, on the other hand, need multiterminal, time-synchronized measurement stations for complicated and/or inhomogeneous networks to correctly detect the fault site .Razzaghi et al. developed an effective fault finding approach using the electromagnetic time reversal (EMTR) technology [2]in. The technique uses the telegrapher's equations' time invariance to locate faults of various types and impedances in complex and inhomogeneous networks, and it has been proven to be extremely efficient and accurate. One of the most significant benefits of this technique is that it only requires one measuring site. The proposed method based on time reversal theory is applied in three steps: measurement of fault originated electromagnetic transients in a single observation point, simulation into a suitable model of the

targeted network of the back-injected time-reversed measured fault signal for different guessed fault locations, and (3) determination of a fault location. The proposed method has been successfully validated for a variety of networks, including inhomogeneous networks made up of overhead transmission lines and underground cables, radial distribution networks, series-compensated transmission lines, and, most recently, multi-terminal HVDC networks. For lossless lines, the telegrapher's equations are invariant under a time-reversal transformation, as described in. Unless an inverted-loss media is included for the reverse times, electromagnetic propagation including a dissipative medium is not strictly time reversal invariant .However, putting an inverted-loss medium into practice may be difficult, particularly when utilizing commercial coding. In this regard, we aim to investigate three distinct back-propagation models: lossless, lossy, and inverted-loss, in order to examine the impact of line losses on the accuracy[3] of the fault identification technique in this article. The transmission line (TL) theory will be used to underpin the study. We'll use Figure 1 to depict the equivalent circuit of a differential length of a single-wire line above a ground plane for the purpose of simplicity. Losses (in the conductor and in the ground) basically result in an attenuation of transmitted transients and a change of propagation speed, both of which are frequency dependent. The hange of the propagation speed is anticipated to be more important than the attenuation of the amplitude in the application of the EMTR to fault identification when time is key. It’s worth noting that this isn't a practical model since the line becomes active and provides energy to the signal traveling down it. Although certain software does not support negative parameters, this model may be numerically implemented. In this instance, the telegrapher's equations are easily shown to be time-reversal invariant. Under the premise that the line parameters are precisely known, the application of this model should result in an accurate location. The losses in back propagation are ignored in this approach. [4]In other words, the per-unit length parameters of the back-propagation line associated with losses become: As a result, the propagation and phase velocity will not be the same as during direct propagation, potentially leading to errors in fault location identification’s consequence, the back propagation propagation constant is as follows: The back propagation in this model is done using a lossy line model. In this instance, the back propagation line per-unit-length parameters are: The propagation speed, which is a crucial characteristic, stays constant even if a lossy medium is not time-reversal invariant. As a result, it can be shown that at the fault site, all contributions from discontinuities that would occur in a real network would add up in phase. As a consequence, we may anticipate more accurate results from this model than from a lossless back-propagation model. [4]we’ll use a basic configuration of a 10-km long single-wire overhead line over a finitely conducting ground to compare the performance of the three models presented in the preceding section. The imagined fault is 8 kilometers from the left terminal, which records the voltage transient produced by the fault. The method for locating EMTRs is outlined in and summarized in Section I. The losses are taken into account in the direct time propagation, and the back-propagation is simulated using each of the three models given in Section III. The calculation is performed in the frequency domain, with a frequency range of 1 kHz to 1 MHz, and is done in Matlab. The line's per-unit-length parameters were calculated using the equations given in. [5]the magnitude of the total per-unit-length longitudinal impedance Z' as a function of frequency. The contributions of the inductive term, ground, and wire impedances are also presented in the same figure. It can be observed that the ground losses are more significant than the conductor losses. Figure 1 discloses the Equivalent circuit of a single-wire line above a ground plane

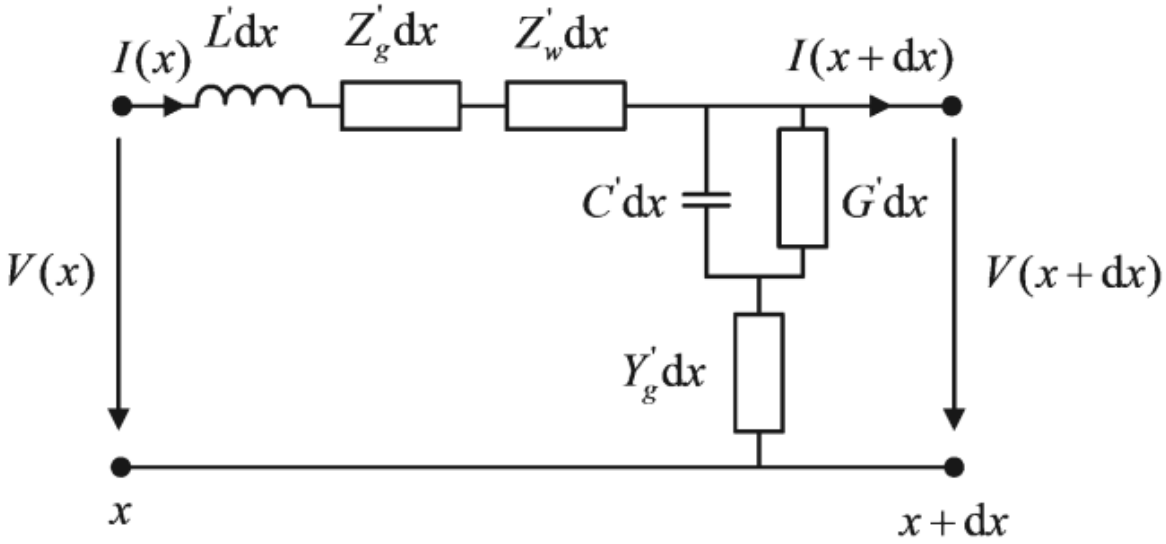

Figure 1: Equivalent Circuit of a Single-Wire Line above a Ground Plane.

2. DISCUSSION

The distribution of lots capacitive term is clearly dominating, and the losses due to transverse air and ground admittances are minimal .the magnitude of transverse admittance per unit length as a function of frequency. g = 0.001 S/m is the ground conductivity. When losses in the line are taken into account, the plot of phase and group velocities as a function of frequency because the line in question is above, the velocity is almost equivalent to the speed of light in vacuum when losses are taken into account. Frequency-dependent phase and group velocities. g = 0.001 S/m is the ground conductivity. The normalized energy of the current flowing from the conductor to the ground in back-propagated time at various estimated fault sites along the line is shown in The simulations were run using the three back-propagation models given in and two different ground conductivity values, g = 0.01 S/m and g = 0.001 S/m).The lossy and inverted-loss models were able to identify the defect at the right location, as can be shown (8 km). The lossless back-propagation model, on the other hand, was unable to correctly identify the problem. The location errors for the two ground conductivity levels examined (0.01 S/m and 0.001 S/m) were 800 m and 1.3 km, respectively .The findings are in line with those obtained when using EMTR to detect lightning discharges . Figure 2 discloses the Fault current energy normalized to its maximum, for the three proposed models. (a) Ground conductivity σg = 0.01 S/m. (b) Ground conductivity σg = 0.001 S/m[6].

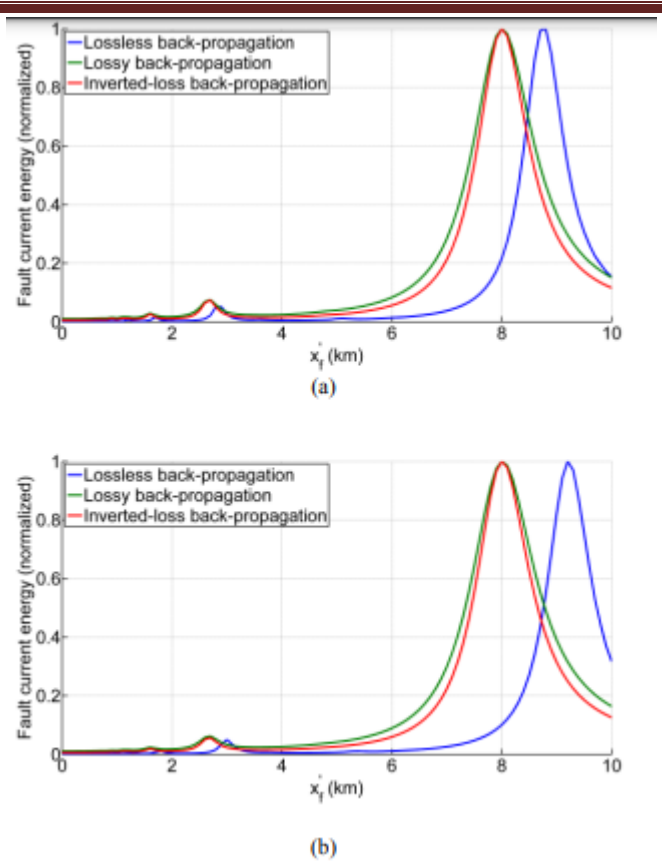

Figure 2: Fault Current Energy Normalized To Its Maximum, For The Three Proposed Models. (A) Ground Conductivity Σg = 0.01 S/M. (B) Ground Conductivity Σg = 0.001 S/M.

An iterative method may be used to concentrate energy on a passive source, such as a kind of isolated reflector. The TRM sends off a plane wave that moves toward and is reflected by the target. The reflected wave reaches the TRM, giving the impression that the target has sent out a (weak) signal. As is customary, the TRM reverses and retransmits the signal, sending a more concentrated wave toward the target. The waves get more concentrated on the target as the procedure is repeated. Another option is to utilize a single transducer in conjunction with an ergodic cavity. An ergodic cavity, by definition, is one that allows a wave to originate at any place and travel to any other point. An unevenly shaped swimming pool is an example of an ergodic cavity: if someone jumps in, the whole surface will eventually ripple with no apparent pattern. A wave beginning at any place will reach all other locations an unlimited number of times if the propagation medium is lossless and the borders are perfect reflectors. This feature may be taken advantage of by recording for a long period with a single transducer to capture as many reflections as feasible[7].

The time reversal method is based on a property of the wave equation known as reciprocity: if a wave equation solution exists, then its time reverse (with a negative time) is also a solution. Because the conventional wave equation only has even order derivatives, this happens. Although certain media are not reciprocal (for example, extremely lossy or noisy media), many others, such as sound waves in water or air, ultrasonic waves in human bodies, and electromagnetic waves in free space, are. In addition, the medium must be somewhat linear. A matching filter may be used to simulate time reversal methods. If the original signal is a delta function, the received signal at the TRM is the channel's impulse response. The TRM effectively auto correlates the impulse response by sending the reversed version back via the same channel. The origin, where the original source was, has a peak in this autocorrelation function. It's crucial to

understand that the signal is focused both in space and time (in many applications, autocorrelation functions are functions of time only).The TRM may also be thought of as a "channel sampler" in a time reversal experiment. The TRM monitors the channel during the recording phase and utilizes that information to focus the wave back to the source ideally for transmission.Mathias Fink of the ÉcoleSupérieure de Physique et de ChimieIndustrielles de la Ville de Paris is a renowned researcher. His team has conducted many ultrasonic TRM tests. A single source transducer, a 96-element TRM, and 2000 thin steel rods placed between the source and the array were used in an intriguing experiment. Both with and without the steel scatterers, the source delivered a 1 s pulse. In the retransmission phase, the source point's temporal and spatial widths were measured. With the scatterers, the spatial breadth was approximately 6 times smaller than without. The spatial breadth was also smaller than the diffraction limit, which was defined by the size of the TRM with the scatterers. Because the scatterers improved the array's effective aperture, this is feasible. The focusing was still very excellent even after the scatterers were shifted slightly (on the order of a wavelength) between receive and transmit stages, demonstrating that time reversal methods may be resilient in the face of a changing medium. Furthermore, José M. F. Moura of Carnegie Mellon University was heading a research team attempting to apply Time Reversal concepts to electromagnetic waves, and they were able to obtain resolution beyond the Rayleigh resolution limit, demonstrating the effectiveness of Time Reversal methods. Their research focuses on radar systems, with the goal of improving detection and imaging methods in extremely crowded settings, where Time Reversal techniques seem to be most useful. The beauty of time reversal signal processing is that no knowledge of the channel is required. The process of transmitting a wave across the channel essentially measures it, and the data is used to concentrate the wave during the retransmission phase. To optimize the system, one does not need to solve the wave equation; all one has to know is that the medium is reciprocal. As a result, time reversal is well suited to applications using inhomogeneous material. The fact that time reversal signal processing employs multipath propagation is an appealing feature. Multipath effects must be compensated for and corrected in many wireless communication systems. By using the energy from all routes, time reversal methods take use of multipath[8].

Fink envisions a cryptography application based on ergodic cavity geometry. The key would be made up of two transducer sites. One plays the message, while the other captures the waves as they bounce about the cavity; this recording will appear as noise. There is only one place to launch the waves from in order for them to concentrate when the recorded message is time reversed and played again. Only one other place will show the focused message wave if the playback location is accurate; all other locations should seem noisy[9].

3. CONCLUSION

Electromagnetic time reversal (EMTR) is a relatively new concept. Effectively used to the issue of power grid failure detection networks. We provided an examination of the impact in this article. Financial losses due to the use of EMTR to detect faults the use of EMTR to detect problems is, in theory, simple. For lossless lines, the Telegrapher's rule applies. Under a time-reversal transformation, equations are invariant. A dissipative medium is used in electromagnetic transmission. Unless an inverted-loss model is used, it is not strictly time reversal invariant.Forthe reversal timings, medium is taken into account. The usefulness However, implementing an inverted-loss medium may be difficult. Especially when utilizing commercial codes, this may be an issue.We looked at three alternative back-propagation models.to solve the problem of EMTR not being lossyinvariantIlossy, (ii) lossless, and (iii) inverted-lossWe demonstrated this via a numerical example involving aa single-wire line that, as anticipated, runs above a conducting groundFor back-propagation, an inverted-loss model produces aEstimation of the fault position to a tee. We've also shownthat a back-propagation model that takes losses

into account results in an exact position estimate of the fault, even if even if the telegrapher's equations aren't exactly correct in this instance Invariant with respect to time. This is an important outcome since it enables commercial programs to be used to mimic the back propagation phase, when time-reversed fault-generated transients are fed into the network. The evaluation and modeling of future work will be included. More realistic setups (underground wires, etc.)Lines and networks with many conductors)[10]

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ON-LINE IDENTIFICATION OF INCIPIENT FLAWS IN UNDERGROUND CABLES USING SINGLE-END SHEATH CURRENTS

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ABSTRACT

Underground cable problems would occur frequently until they developed into permanent defects. The detection of incipient faults may help assess the condition of cable insulation and give an early warning before subterranean wires break down. In the modal domain, the properties of incipient fault traveling waves are investigated, and theoretical analysis reveals that the sum of sheath currents may be utilized to identify incipient faults. To identify an incipient defect, both the over-current and the wavelet transform modulus maximum of the sum of single-end sheath currents are evaluated. The defective phase is chosen based on the root-mean-squares of three phases once an incipient problem is identified. PSCAD/EMTDC is used to create a cable system model and simulation results indicate that the detection method can correctly identify incipient faults in a variety of fault situations.

KEYWORDS: *Terms-Incipient Faults, Over-Currents, Sum Of Sheath Currents, Underground Cables, Wavelet Transform Modulus Maxima.*

1. INTRODUCTION

With the expansion of the electrical system grid, underground cables have become more popular. Underground cables must operate safely and reliably to provide power supply dependability. In contrast to problems in overhead transmission lines, cable breakdowns are gradual and take place over time. Before permanent defects develop, cables may suffer incipient problems. Insulation degradation is the most common cause of incipient problems. Incipient flaws become more common as the degradation progresses. Incipient flaws would eventually fail and become permanent defects .Incipient faults usually last a half-cycle and are extinguished when the current reaches its first natural zero crossing. Traditional protection systems are unable to identify these developing flaws until they have progressed to the point of catastrophic collapse. Early detection of incipient defects may give an early warning for the failure of the faulty cable, preventing unanticipated outages and losses. The wavelet analysis is used to evaluate IEEE transient voltages and currents in the time domain, frequency domain, and time-frequency domain. The superimposed current components and neutral current are used in to identify incipient defects. Another study uses the amplitude of neutral current and the magnitude of rate

of change of neutral current to identify self-clearing transient faults. However, since these techniques monitor voltages and currents from buses or neutral lines, they are complex and have limited application. Based only on single-end sheath currents, this article offers a new technique for identifying incipient defects in subterranean cables. Because most high-voltage cables include a metallic wrapping around the conductor, the suggested technique may be used in a variety of situations[1].

The following is a breakdown of the paper's structure. Section II presents sheath bonding techniques and uses PSCADIEMTDC to create a cable system model. The features of incipient fault traveling waves are examined in Section III, and it is concluded that the sum of sheath currents may be utilized to identify incipient faults. The detection method for incipient errors is presented in Section IV.In Section V, incipient defects are simulated in PSCAD under various circumstances and the detection results are shown. The conclusion is found in Section VI.The conductor currents contribute the most to the induced voltage in the metallic sheath of single conductor cable, which is also linked to the length and arrangement of the cables .When the cable is extremely long, the induced voltage raises to a high level, increasing the loss, reducing cable life, and endangering human safety. As a result, the sheath must be grounded to keep the induced voltage to a minimum. Bonding and grounding techniques for various cable lengths include both-end bonding, single-end bonding, cross-bonding, and cross-bonding with The PSCAD/Frequency-Dependent EMTDC's (Phase) model represents all parameters' frequency dependency, making it the most sophisticated and precise time domain line model [11]. As illustrated in Fig. 3, a simpler cable system is constructed in PSCAD using the Frequency-Dependent (Phase) model. A 35kY source, a 35/220kV transformer, three cable lines, and loads make up the system. Each cable line is 500 meters long and is divided into three stages. Transient faults lasting 5ms are used to mimic incipient defects, with a solution time step of 0.1 fls.A three-phase cable system is made up of three single-conductor cables. The three phase cable system has six conductors since each single-conductor cable has two conductors, namely the conductor and the sheath. There is electromagnetic coupling between the conductors. The six-conductor system must be decoupled in order to investigate the properties of traveling waves from incipient faults. A, a, B, b, C, c (uppercase letters indicate conductors, lowercase letters indicate sheaths) are the conductors and sheaths of three phases, respectively. The six conductors are rearranged in the following order: A, B, C, a, b, c, a, b, c, a, b, c, a, b, c, a, b, c, a, b, c The voltage phase-modal transformation matrix S may therefore be QT in high frequencies, and the current phase modal transformation matrix Q can be the extended matrix of Clarke transformation matrix. The Clarke transformation matrix looks like this.Figure 1discloses THE Schematic Diagram of Single-End Bonding[2]

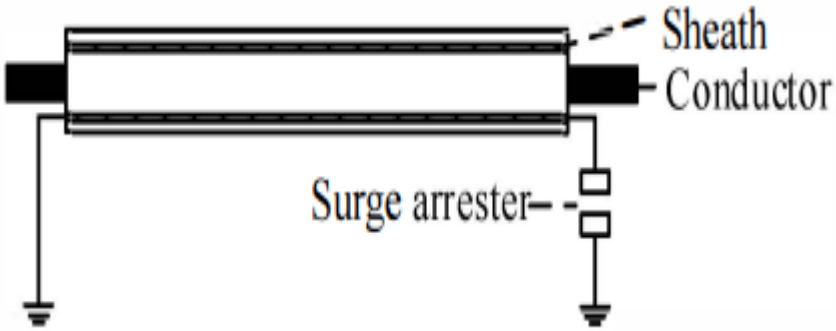

Figure 1: Schematic Diagram of Single-End Bonding

2. DISCUSSION

2.1.Application:

A single-wire earth return (SWER) or single-wire ground return is a low-cost single-phase electric power transmission line from an electrical grid to distant regions. Its distinctive characteristic is that the earth (or sometimes a body of water) is utilized as the current's return route, obviating the necessity for a second wire (or neutral wire).Single-wire earth returns are often utilized in rural electrification, but they may also be used for larger isolated loads like water pumps. It's also utilized in undersea power lines for high-voltage direct current. A comparable technology is used in electric single-phase railway propulsion, such as light rail. It utilizes earth resistors to minimize rail voltage dangers, but the main return currents are still via the rails.Figure 2 discloses the Structure and Arrangement of Single-Conductor Cables

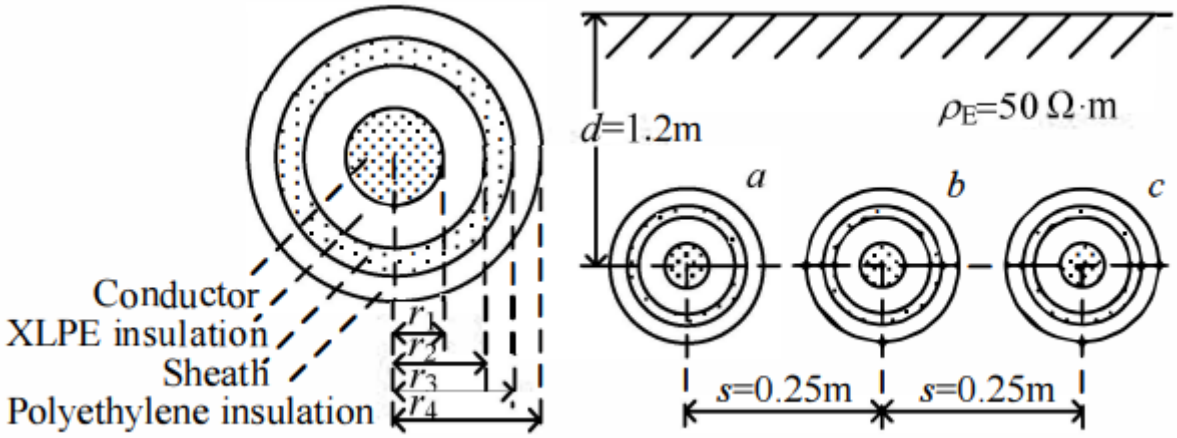

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Figure 2: Structure and Arrangement of Single-Conductor Cables.

When traditional return current wire would cost more than SWER's isolation transformers and minimal power losses, SWER is a feasible option for a distribution system. SWER is similarly safe, more dependable, and less expensive than traditional power lines, according to power experts who have worked on both. However, SWER is somewhat less efficient than conventional lines. When maintenance is inadequate, SWER may create fires, and bushfire is a danger. An isolating transformer with a capacity of up to 300 kVA supplies power to the SWER line. This transformer separates the grid from the ground or the earth, converting grid voltage (usually 22 or 33 kV line-to-line) to SWER voltage (generally 12.7 or 19.1 kV line-to-earth)[3].The SWER line is a single conductor with a number of distribution transformers that may run for tens or even hundreds of kilometers. Current travels from the line, via the main coil of a step-down isolation transformer, to earth through an earth stake at each transformer, such as a customer's premises. The electricity ultimately returns from the earth stake to the main step-up transformer at the line's head, completing the circuit. As a result, SWER is a real-world example of a phantom loop. The resistance of the soil consumes energy in regions with high-resistance soil. Another problem is that the resistance may be high enough to prevent adequate current from flowing into the earth neutral, causing the grounding rod to float to higher voltages. Circuit breakers that self-reset are typically caused by a voltage differential between the line and the neutral. The decreased voltage differential between line and neutral may prevent breakers from resetting in dry, high-resistance soils. In Australia, areas with extremely dry soils require extra-deep grounding rods. [1]SWER has to be anchored below permafrost, which is high-resistance, according to Alaskan experience. The client will be supplied either single ended single phase (N-0) or split-phase (N-0-N) power in the region's standard appliance voltages through the secondary winding of the local transformer, with the 0 volt line linked to a safety earth that does not usually carry an operational current’s many as 80 distribution transformers may be fed by a big SWER cable. Typical transformer ratings are 5 kVA, 10 kVA, and 25 kVA. The load density

on the line is typically less than 0.5 kVA per kilometer (0.8 kVA per mile). The highest demand of any one client is usually less than 3.5 kVA, although higher loads up to the distribution transformer's capacity may also be provided. In the United States, several SWER systems are traditional distribution feeders without a continuous neutral (some of which were obsolete transmission lines that were refitted for rural distribution service). A grounding rod is installed on each pole inside the substation that feeds such lines, and a grounded conductor is installed on each branch from the line between the pole next to and the pole carrying the transformer (giving each transformer two grounding points for safety reasons).Mechanical engineering SWER line's mechanical design may reduce its lifetime cost while also increasing its safety. The conductor used in ancient SWER lines was [4]Number-8 galvanized steel fence wire since the line has high voltage with modest currents. The AS1222.1 standard is used in more contemporary systems. Aluminum-clad high-carbon steel wires in coastal regions, aluminum wrapped wires rust, although they are otherwise more appropriate. Wind vibration may damage the wires because of the large spans and high mechanical stresses. Spiral vibration dampers are used on the wires in modern systems. Because polymers are susceptible to UV degradation, most insulators are made of porcelain. Higher-voltage insulators are installed by certain utilities so that the line may be readily upgraded to carry greater power. 12 kV lines, for example, may be insulated to 22 kV, whereas 19 kV lines could be insulated to 33 kV. SWER lines have historically utilized reinforced concrete poles due of their cheap cost, minimal maintenance, and resilience to water, termites, and fungus. In most cases, local labor can manufacture them, reducing prices even further. Metal poles are prevalent in New Zealand (often being former rails from a railway line). Poles made of wood are allowed.

2.2.*Working:*

To allow giraffes to pass safely under the lines in Mozambique, poles have to be at least 12 m (39 ft) tall. If a location is prone to lightning, newer designs include lightning ground straps into the poles before they are erected. The straps and wire may be adjusted to make a low-cost lightning arrestor with rounded corners that won't draw a lightning strike. For proof, this section needs more citations. Please contribute to the improvement of this article by citing credible sources. It is possible that unsourced[5] content may be questioned and deleted. (March of this year) (To find out when and how to delete this template message, see the instructions at the bottom of this page.)) [6]Because the earth is isolated from both the generator and the user, SWER is touted as a safe system. Most other electrical systems utilize a common ground or a metallic neutral linked directly to the generator. It's crucial to get your bearings. Near the earth points, significant currents on the order of 8 amperes run through the ground. To avoid electric shock from an earth potential increase around this point, you'll need a good-quality earth connection. There are also separate grounds for power and safety. Because the ground points are duplicated, the system remains secure even if one of them is destroyed. A suitable earth connection is typically a 6 m copper-clad steel post driven vertically into the ground and connected to the transformer earth and tank. 5–10 ohms is a decent ground resistance, which may be tested using appropriate earth test equipment. SWER systems are intended to keep the earth's electric field below 20 volts per meter to prevent shocking humans and animals nearby. Automatic circuit breakers are also included as standard features (reclosers). The majority of overcurrent faults are transitory. Because the network is rural, the recloser will remove the majority of these problems. For transformer protection and switching, each service location requires a rewirable drop out fuse. A conventional high-rupture capacity (HRC) fuse or low voltage circuit breaker should also be used to safeguard the transformer secondary. On the high voltage side, a surge arrestor (spark gap) is popular, particularly in lightning-prone regions.The majority of fire safety risks in electrical distribution are caused by aged equipment, such as corroded wires and broken insulators. In many situations, the reduced cost of SWER

maintenance may lower the cost of safe operation. SWER prevents lines from colliding in the wind, which is an important fire-safety feature, but the official inquiry of the Black Saturday[5] bushfires in Victoria, Australia, revealed a flaw. These showed how a damaged SWER wire may short to ground over a resistance comparable to the circuit's typical load, which in this instance was a tree. Without a ground-fault indicator, this may result in significant currents. In fire-prone regions, where a conductor may break and electricity may arc over trees or dry grass, this may be dangerous. Ground-return current may impair bare-wire or ground-return telecommunications if the grounding region is closer than 100 m or sinks more than 10 A of current. Radio, fiber optic channels, and mobile phone networks remain unaffected. A metallic return line from the load to the generator is required by several national electrical standards (most notably in the United States).Each SWER line in these jurisdictions must be authorized by exception. Benefits in terms of cosSWER's primary benefit are its cheap price. It's often utilized in sparsely inhabited regions when the expense of constructing a standalone distribution line is prohibitive. The cost of capital is approximately half that of a two-wire single-phase line. They may cost up to 30% less than three-wire three-phase systems. The cost of maintenance is approximately half that of a comparable line[7].SWER also lowers the number of poles, which is the most expensive part of a distribution network. Traditional 2-wire or 3-wire distribution lines offer a greater capacity for power transmission, but they may need up to 7 poles per kilometer and spans of 100 to 150 meters. Because of SWER's high line voltage and low current, low-cost galvanized steel wire may be used [8]. Steel's higher strength allows for spans of 400 meters or longer, decreasing the number of poles per kilometer to 2.5.The power company's construction expenses may be further lowered if the poles also carry optical fiber cable for telecommunications (metal conductors may not be utilized).SWER may be utilized in a grid or a loop, although it's more common to use it in a linear or radial form to save money. A single-point failure in a SWER line causes all customers farther down the line to lose power in the traditional linear manner. SWER, on the other hand, has fewer components in the field, thus it is less likely to fail. Winds, for example, cannot cause lines to collide since there is only one line, eliminating a source of damage as well as a source of rural bushfire Excessive ground currents from shorts and geomagnetic storms are less common than in traditional metallic-return systems because the majority of the transmission line has low resistance connection to earth. As a result, SWER has fewer ground-fault circuit-breaker openings that may cause service interruptions. Upgradeability Without the need for additional poles, a well-designed SWER line may be significantly upgraded as demand increases. Replace the steel wire with more costly copper-clad or aluminum-clad steel wire as a first step. It's conceivable that the voltage may be increased. Some long-distance SWER lines currently have voltages of up to 35 kV. Normally, this would need the replacement of insulators and transformers, but no new poles are required. A second SWER line may be added if additional capacity is required.[9]

3. CONCLUSION

A new on-line detection method for incipient errors is presented in this article. The total of single end sheath currents may be utilized to identify incipient defects, according to theoretical analysis and simulation calculations. Both the over-current and the wavelet transform modulus maximum of sheath currents are evaluated in the detection method. The suggested detection method can correctly identify 798 incipient defects under various circumstances, according to simulation results in PSCAD/EMTDC. Sheath currents can be readily monitored via the sheath grounding lines, thus using the sum of sheath currents as the detecting signal provides a high sensitivity. As a result, this technique has a broad range of applications[10].

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THE ROLE OF LINGUOCULTURAL CODES IN THE CREATION OF A LINGUISTIC LANDSCAPE OF THE WORLD

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ABSTRACT

The theory of linguocultural codes is one of the basic theories in the field of linguoculturology. This phenomenon, which takes place mainly in stable and metaphorical units, is an important linguocultural phenomenon that reflects the national way of thinking of each nation and the order of perception of objective reality. The article commented on the interpretation of existing linguocultural codes in general linguistics, saying that cultural codes are primarily a phenomenon related to the national-cultural character of a people; Therefore, the study of the nature of each language, including the mythological notions, national values, cultural norms, customs and beliefs of the people, the axiological attitude to reality, should be the focus of researchers, its role in the study of units was substantiated and problems in this regard were pointed out.

KEYWORDS:*Linguocultural studies, artifacts, archetypes, linguocultural codes, biomorphic codes, zoomorphic codes, spiritual codes, somatic codes, spatial codes, temporal codes, subject codes, linguocultural communities, linguistic landscapes of the world, stable connections, metaphors.*

INTRODUCTION

One of the founders of linguocultural studies, V.N. Telia writes: “Culture has its own language: it speaks to us through architecture, painting, music, dance, literature and other products of human creativity. But the most universal means of the “language” of culture is the natural language” [9, p. 12]. Linguistics, which is a product of the integration of sciences, formed in collaboration with the fields of linguistics, cultural studies, ethnography, psycholinguistics [8, p.8-9] introduced a number of new concepts such as connotativeness, cultural semaphore, precedent units, linguistic consciousness, linguistic landscape of the universe, value landscape of the universe. Among them, the concept of cultural codes has a special place. It is well known that a set of customary and obligatory methods of perceiving the world, historically formed, stabilized, and specific to that language community in the minds of each language community,

creates a linguistic picture of the world. The linguistic landscape of the world is a collection of universal and at the same time nationally adapted methods of perceiving and conceptualizing the world. In linguocultural studies, cultural codes are recognized as one of the important components of the linguistic landscape of the world [7, p.79]. According to V.N. Telia, cultural codes are a system of secondary symbols consisting of various material and formal means used to encode a particular cultural content [9, p.13].

The definition of cultural codes by DB Gudkov, ML Kovshova is also close to the above definition:

“Cultural codes are a system of symbols that represent the cultural content of the material and spiritual world of man, which can be both verbal and nonverbal” [2, p.6] Experts in the field of cultural codes often quote the figurative description of the Russian researcher V.V.Krasnix in his article "Cultural codes and standards (invitation to interview)”. According to the scientist, cultural codes can be thought of as a net thrown into existence. This "network" of our thinking divides, organizes shapes and evaluates the world around us [4, p.6]. According to culturologists, cultural codes are the key to understanding culture, which allows the identification of cultural information encoded in any form [6, p.512].

MAIN PART

Based on scientific definitions and interpretations of cultural codes, it can be said that the term refers to a system of material or ideal symbols that express a particular cultural content in a conditional, symbolic, and coded way. Cultural codes are the product of the process of categorizing the world by man, and in this, as noted above, human language is one of the most important expressions of cultural content. Codes realized through verbal means are linguocultural codes. Linguocultural codes are reflected in the language in linguocultural units such as proverbs, phrases, constant analogies, metaphors, curses, prayers, and applause, which mainly reflect the figurative thinking of the people. In such codes, people's ideas about the material and spiritual world, national thinking, axiological views are clearly visible. Types of linguocultural codes in the scientific literature include somatic code, spatial code, temporal code, subject code, biomorph code, spiritual code [4, r.8], anthropomorphic code, spatial code, war code, medical code, architectural code, sports code, geometric code, gastronomic code, dress code [7], mythological code, theomorphic code, color code [5, p. 169]. Some researchers consider zoomorphic code and phytomorphic code to be types of biomorphic code; biomorphic code is sometimes also referred to as plant-landscape code.

On the main types of cultural codes in linguocultural studies, V.V. Krasnix's classification is recognized. The scientist defines somatic code, spatial code, temporal code, subject code, biomorphic code and spiritual code as the most basic types of cultural codes. In his opinion, the content expressed in these codes is consistent with the archetypal ideas of Russian culture, reflecting the first simple impressions about the structure of the universe. [4, p.8] It is well known that man began the study of being by self-knowledge. It was the first attempt to civilize the world. Man first described the being from himself (for example, *the top of a mountain*), and then began to describe himself by this method (for example, *if the head survives, a doppia (national head wearing) is found*).

In this case, the name of the members of the human body has a symbolic (portable) meaning. V.V.Krasnix cites as an example the use of the words *golova* (head), *plechi* (shoulders), *ruki* (hands) in the sense of “man” in the *schitat po golovam, naeyoplechaxlejalabolshayaotvestvennost, ne xvataetrabochixruk* [4, p. 9]. As a result of the evolution of human thought, some somatic codes became spatial codes. The scientist cites this as evidence that the human heart is perceived as a space of emotions and the head as a space of thoughts and this is reflected in a number of expressions. The same situation can be found in the

linguistic culture of many peoples of the world, especially in the Uzbek language. For example, one of the semantics of the internal lexeme is synonymous with comatisms of heart, mind, soul, tongue [12, p.248].

In this regard, S. Ikramova writes:"The lexeme of diarrhea comes as a basic component in the phrases bitterness, swallowing, swallowing, emptying, dog scratching, fever, nausea, diarrhea: ... stomach ache, swallow, dog scratch , a distressing state of eating phrases; a state of spiritual relief from emptying the bowels; the words heartbroken and hot inside signify a state of impatience. From this it is clear that the Uzbek lexeme represents a spiritual space in the Uzbek worldview" [3, p. 98].

Spatial code is also one of the main codes in linguocultural studies. Spatial code is logically related to temporal code because the concepts of time and space are associatively understood in the human mind and require each other. "While space represents the scale of things, the order of their relative positions, continuity or continuity, time represents the sequence of events, the continuity of processes. It is known that every material body has a place, a volume, a scale. Space is the order of the points that make up the universe at a particular moment in time, while time is the sequence of events that take place at a particular point in space "[1, p. 234].Spatial code is associated with semantic oppositions such as its *own - alien, far - near, high - low, east - west*, and is the result of efforts to perceive the world as divided by man [5, p. 169].Human perceptions of flora and fauna are reflected in biomorphic codes. According to V.V.Krasnix, many standards in different linguocultures emerged as a product of biomorphic codes [4, p.16]. 3 This can also be seen in the Uzbek standards such as *ant* (symbol of hard work), *fox* (symbol of cunning), *lion* (symbol of courage), and *donkey* (symbol of stupidity). Subject codes are formed through the symbolic meaning of the names of most everyday objects:Words such as in the cauldron, everything goes to the bucket, the king has a gray patch on the bed, there is a belt around his waist, he puts his coat upside down, the pot in the units to lift the sieve out of the water, the bucket, the bed, the belt, ton, galvir show how the concepts of household items have become a tool for Uzbek linguists to express reality and social relations in it.The spiritual code, which is one of the codes of culture in linguocultural studies, is a code that reflects the cultural opposition, moral or religious values of the people, such as good - bad, beautiful - ugly, high - low. According to V.V. Maslova, the spiritual code has an ontological nature, and evaluation and expression are its main features [7, p.83]. In verbal expression, subject codes are often combined with spiritual codes. For example: Your homeland is a golden cradle; not a friend staring at the table; put a blanket in the shade.

It should be noted that the scientific views on the codes of culture formed in Russian linguistics also had an impact on other linguistics. In Uzbek linguistics, however, there is very little information about cultural codes. The glossary of linguistic and cultural terms explains the terms culture code, somatic code, time code, spatial code, subject code, spiritual code, biomorphic code [11, p. 22, 29-30, 34-35]. In Chapter 2 of F.Usmanov's research, analogies are studied in conjunction with linguocultural units [10, p. 58-90].

CONCLUSION

The theory of cultural codes can be used to study the Uzbek linguistic landscape of the world, to determine the evolution of the laws inherent in the national thinking of our people. At the same time, it should be noted that linguocultural studies is primarily a field that studies the relationship between mental concepts and linguistic units. Cultural codes are primarily a phenomenon related to the national-cultural character of a people. Thus, the study of linguistic and cultural codes in our linguistics is based on the nature of the Uzbek language, in which the mythological ideas, national values, cultural norms, customs and beliefs of the people, the axiological attitude to reality must be the focus of researchers. In linguocultural research, the main criterion should be

to determine the place of the Uzbek national thinking in the perception and description of the world through language. This requires the study of the internal aspects of our language - the Uzbek language, the factors of national cognition, psyche, and worldview. Trends such as a deeper approach to the object of language, its analysis in the context of mental and spiritual abilities inherent in the human phenomenon, the discovery of specific rules of Uzbek "thinking grammar" are stabilizing as the main principles of modern Uzbek linguistics.

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THE IMPORTANCE OF ICT IN SPEAKING COURSES

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ABSTRACT

This article is devoted to the analysis of the usage of Information and communication technologies in speaking classes taking into consideration the importance of speaking fluently and accurately in foreign languages, especially in Englishand Russian.It also concentrates on the significance and essential role of ICTs for improving English and Russian oral skill, as well as it shows technologies areas as the main motivational devices for language learners. Apart from that, it shows the study findings and results of the preliminary questionnaire and initial test taken from teachers and students.

KEYWORDS: *Information And Communication Technology (ICT), English As A Foreign Language (EFL), English As A Second Language (ESL), Russian As A Foreign Language (EFL), Russian As A Second Language (ESL), Imitative Speaking, Intensive Speaking, Responsive Speaking, Interactive Speaking And Extensive Speaking, CD-Roms And Dvds.*

INTRODUCTION

There is a great and vital role of Information and communication technologies (ICTs) in enriching English as a foreign language (EFL) learners' oral language proficiency. Foremost, we should state speaking skills and their importance in learners' life. When thinking about learning a foreign language, we should say that the primary aim of almost all learners is to be competent and fluent speakers of the target language. Most students reckon that among four key skills, speaking is the most interesting and difficult as well. However, they try to pay more attention and interest to their oral performance.

We often hear and face with some learners whose English is good or bad, we may say he/she is good or bad at English. So, we should keep in our mind that it is not so easy to learn to speak English fluently and accurately when it is our second or foreign language. Many students can read and write well in the target language, but they are poor at speaking and listening. Most learners are too afraid of talking in class. They are shy and lack confidence, even some students sound very "bookish" when they speak–it's as if they are reading from a book or it seems as they have learned by heart the context. Most learners love to speak and they are keen on speaking English, but they make many grammar and lexical mistakes. It is not surprising as English is not our mother tongue as a native speaker. To reduce some impediments which are occurred while

learning English and speaking in the target language fluently and easily we should involve the use of several simultaneous processes–cognitive, physical and socio-cultural with the help of utilizing and integrating ICTs in the classroom.

MAIN PART

According to Bygate, "speaking is a skill that all people use when they are interacting with each other; therefore, speaking is regarded as the most important

The skill that learners require speaking fluently in the classroom situation" [1, 4]. Most language learners indeed want to have enough practice in speaking a foreign or second language to communicate with their peers and people who visit from overseas. Using language is one of the effective ways of expressing thoughts and ideas, and opinions as well.

According to Brown, there are five types of speaking based on the speaker's intentions. They are imitative speaking, intensive speaking, responsive speaking, interactive speaking and extensive speaking [2, 18].

We want to state deeply about all five types of speaking and show the importance of ICTs to improve each type.

Imitative speaking is repeating others' speech, phrase or sentence as a parrot. This kind of repetition includes all language features as grammar, lexis and others to interact in communication and in this type of speaking great attention should be paid to pronunciation. If we talk about the significance of ICTs in this type of speaking there will be a huge role of technologies in this part. ICT may take place of teachers in the English classroom and it is used as a "repetition tool" during learning new vocabularies, songs and poems and so on. It will be more useful and interesting for learners rather than the teacher's repetitions.

In Intensive speaking, the speaker should know the semantic properties of the language, as short stretches, intonation, stress and rhythm. And this type of speaking includes some assessment tasks as sentence and dialogues completion and reading aloud as well. In this, part computer devices are acting as in the first type of speaking and besides that computer, projector and electronic board should be used while improving intensive speaking. To fulfil the tasks as dialogues, monologues, sentences completion instead of a blackboard, an electron-multimedia board can be utilized for enhancing learners' interest and motivation. As learners cannot be effective in tomorrow's world if they are trained in yesterday's skills.

Responsive speaking includes short interactions as dialogues, conversations with simple questions and small talks. Such as

A: Pardon me, do you have the time?

B: Yeah, ten-fifteen.

In this kind of speaking computer tools are vital as the wings of a bird. Because after watching small dialogues and conversations' videos on a computer screen or projector learners may have enough practice by seeing and there will be good participation during the class. As seeing is half learning and most of the students are a visual type of learners, and in this case, it is very handy to use IC technological devices.

Interactive Speaking differs from responsible speaking, as responsible speaking includes brief conversations, however, interactive speaking involves complex and long dialogues and interactions. There are two forms of language: transactional language and interpersonal language. The transactional language aims to exchange only specific information. Interpersonal language is full of slang, ellipsis, which means it is colloquial language. Interviews, role play and discussion activities are considered as main assessment tasks of interpersonal language. After

listening or watching about some topics via projector or computer, learners may reflect their opinion on the current theme and will make discussion and debates among students.

The last type of speaking- Extensive Speaking includes speeches, oral presentations and story-telling. It is more formal and we cannot use informal monologues like casual speech. To show a presentation or deliver our speech effectively, we should use IC technologies, it will be very fruitful for the speaker and more interesting for the audience.

There are some ICT techniques in the classroom which are effective and helpful for teachers to enhance learners' oral performance and they are key factors for mastering speaking skills. Using CD-ROMs and DVDs is important in learning and teaching English. Teachers of oral expression may use these devices to teach the speaking skill for its significant advantages. According to Dundey and Hockly believe that "the use of CD-ROMs in the classroom has a positive effect on students' performance because when they are exposed to authentic language independently as they called autonomous learning" [3, 115].

So, it is vital to use these tools in the teaching of speaking skills. Using DVDs is helpful for language learners as there may be given subtitles at the bottom of the video. The language learners may switch off the audio of the video andrepeat subtitles several times and without subtitles, they may listen and watch the video then they can act the dialogue by themselves with no subtitle or video.

Using chat is one of the essential ways of improving spoken performance if it is well organized and well-timed. Dudney and Hockly stated that "chat is a tool that allows for synchronous, real-time, communication over the Internet". We consider chatting as an important tool in enriching learners' accuracy and fluency [3, 71].

Speaking and writing are considered productive and active skills while listening and reading are regarded as receptive skills. Therefore, teaching and learning one of the productive skills-speaking is more difficult rather than reading and listening. However, the primary aim of language study is to develop both receptive and productive skills.

METHODS

Research aimed at finding and analyzing got data from both teachers of oral production and first-year students of Samarkand State Architectural-Civil Engineering Institute. Most first-year students cannot speak English confidently and correctly. Lack of practice and interest in learning spoken skills is one of the main reasons for misunderstanding oral performance. The primary aim of the study is to highlight the importance and usefulness of ICTs in improving students' speaking skills.

Foremost, this chapter states the usage of ICTs and their significance in Samarkand State Architectural-Civil Engineering Institute education process. It is a fact that most students when they were applicants to the Institute of FL they learned deeply grammar of the target language. Therefore, today they are lack oral experience or practice to use the language in communication or while expressing their opinions, they are afraid of reflecting their ideas. However, most of such students possess good writing skills, they can easily express their thoughts with the help of their writing skills, they may share their ideas in three or five pages even more than these, however, they (students) cannot speak even two or three sentences without hesitation. To reduce their hesitation and shyness teachers of the Institute, try to give some tasks which are based on group or team working and making presentations on current given topics with the help of IC technologies.

The current study takes place at Samarkand State Architectural-Civil Engineering Institute. The participants are selected from different first-year students. It is important to mention that their level of knowledge, backgrounds and use of the target language differ from each other.

In this study, the primary instrument is teachers' interviews and the secondary is students' questionnaires. The researcher interviewed five teachers of EFL at SamIFL and there was used a semi-structured interview. We selected them to know how and in what case they use ICTs during classes and to improve their students' speaking skills. The interview comprised eight questions, four of them belonged to teachers' experience in teaching oral production courses, and four of them were connected with the usage of ICTs as new tools of teaching FL.

The students' questionnaire is considered a secondary instrument in this research. It was concerned with the first-year students of Samarkand State Architectural-Civil Engineering Institute to know how and when as well as in what context they use IC technologies and to have some information about the usage of ICTs in developing their oral proficiency or not. The questionnaire includes seven questions as one of them was about participantsthemselves, four questions connected with their interests and attitude toward speaking skills, and the other two questions belonged to whether they prefer using ICT resources to enhance their oral production or there are any other ways or methods which are used by students.

RESULTS AND DISCUSSIONS

Teachers' interview was taken to know the significance of ICTs in speaking classes and to improve students' skill, motivation and interest as well. This interview included ten questions.

One question is based on which IC devices do theypossess and we can see the following results below:

Electronic devices	**Number**	**%**
Laptop	5	100%
Electronic Music Device	3	60%
Memory cards	4	80%
DVDs, CDs, MP3 player	2	40%
Printer	3	60%

When we asked what do they think, why do some students find that speaking in the target language is very difficult to speak fluently or accurately in FL. This question was given to know whether teachers are aware of students' difficulties and challenges while speaking in a foreign language or not. Two EFL teachers stated that the reason for the difficulty in speaking is lack of vocabulary and pronunciation, however, one of them thought that lack of practice causes a barrier in speaking. And other two of them added some learners are not competent because they do have not self-confidence, shyness and doubting about their level.

When we asked which method or technique, do they usually use in oral expression sessions, three teachers said they usually use ICT devices and the audio-video method, as well as visualizations, are helpful for their lesson. Two of them stated they use a mixture of methods of course, with the help of ICTs, like debates, dialogues, role-play. They thought that the usage of ICTs make a fun and interesting atmosphere in the classroom.

After collecting data from teachers next section is devoted to students' questionnaires.Thirty-four students were chosen in this part, twenty of them were male, and fourteen students were female from different the first year. They tried to answer all questions to prevent any misunderstanding. There are given their gender and general information about participants.

This table is showed that female learners are more than male learners, so students use IC technologies more than male learners in learning spoken skills.

Gender	Male	Female	Total
Number	14	20	34
Percentage	41%	59%	100%

When we asked about their difficulties in speaking English, eight students who are good at speaking have not any problems and challenges in oral production. However, the rest of 76% of students have some difficulties in speaking. Lack of practice, vocabulary and pronunciation are the main reasons that they may face while speaking English. Some of them added that the carelessness of a teacher who works with only active and competent students is also one cause of our barriers.

When we asked about theirthought on whether or not ICTs can enhance their speaking skill, the minority of 17% of students do not think that ICTs are helpful tools for developing their skills. As there may not be enough IC technologies and they are not always interesting, contrarily they may disturb us while learning a new thing. However, 83% of learners claimed that IC devices help us to improve speaking skills and feel more confident and comfortable.

CONCLUSION

In summary, based on the above data and research findings, we conclude the following about how well teachers and students use ICT and how much they are aware of them. As we can see that different learners have various ways of learning. However, most students believe that IC technologies can help to improve their oral production. The primary aim of the study was to help learners to enrich their speaking abilities through using of ICTs in lessons.

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"WHO DESTROYED HIS OWN IDENTITY?"

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ABSTRACT

The article discusses the second spiritual birth, which reveals the secret of perfection and requires special research. And in it the examples taken from the poems of the great poet are analyzed. This theme also helps to introduce a new approach to Navoi poetry. It is well known that the classical literature of the East is based on the worldview, oral creativity, religion, culture, spiritual needs and artistic tastes of the peoples of the East. The expansion of interest in the Western world to read it has undoubtedly served its benefit. In scientific research and interpretation, the lack of understanding of the essence, psychological principle, and symbolic structure of this literature has damaged it.

KEYWORDS: *Valodat, Identity, Ego, Greed, Soul, Irfan, Tasawwuf, Sect, Sufi, Symbol.*

Being human is about understanding your identity....
(MirzoBedil)

INTRODUCTION

It is well known that the classical literature of the East is based on the worldview, oral creativity, religion, culture, spiritual needs and artistic tastes of the peoples of the East. The expansion of interest in the Western world to read it has undoubtedly served its benefit. In scientific research and interpretation, the lack of understanding of the essence, psychological principle, and symbolic structure of this literature has damaged it. Uzbek literature, formed under the influence of Soviet-era Russian literature, had neither the will nor the ability to oppose it and advance its own views. As a result, the topics and issues studied by Uzbek literary critics have been largely mastered or copied from abroad. There was no other way to do it. Because classism, partisanship, and ideology have all ensured that we do not go beyond the line set by the rules that must and must be followed.

THE MAIN FINDINGS AND RESULTS

In Eastern classical literature, love for the universe and man begins with love for Allah and His beloved Messenger Muhammad (peace be upon him). In order for man to know himself and manifest himself, he must first know and master the secret of divine love. Otherwise, he will be

lost in love as well as in the vast and eternal truths of life. Unable to protect his life from fleeting lusts and inclinations, he falls into a whirlpool of mistakes. After the victory of the atheist creed, which launched an uncompromising attack on Allah, religion and the Shari'a, it was forbidden in literature to speak about the people and the Creator, the prophet and the ummah, life and the hereafter. To express acceptable views on the policy of the Soviet government and the instructions of the Communist Party was to introduce unprecedented lies and fabrications. Thus, for almost seventy years, the study of religious and moral topics in literature, along with religious literature, has been banned. What was the result of studying and interpreting the Qur'an in accordance with an ideology that was completely alien to its nature and history, separating it from the centuries-old literary samples that had developed on the basis of the teachings of the Qur'an and the Prophethood?Unfortunately, this question has not yet been answered clearly and concisely. None of our classical poets even imagined the concepts of class or ideology. But when one is acquainted with the research of their life and work, one gets the impression that each of them has a preconceived notion of class belief. In the literature centered on Allah and the Prophet, almost all ideas or issues concerning man and humanity are resolved directly or indirectly in connection with these beings, and their effect on thinking and education is also unique. Why the enlightened stimulus and gnosis of reading classical has works diminished over time? Because of the essence hidden behind them, the content put forward by scientists is drastically different from each other. If the emotion, mood, situation, tone of spirit in the literary text is not revived, the poet will not be deeply interested in the commentary or interpretation. There is no point in a sarcastic, distracting analysis.

Introducing a person to himself, depicting the world of identity in figurative forms is one of the first tasks of artistic creation. After all, the “I” ensures its existence. The “I” reflects the unique characteristics of a person. It reveals the strong and weak, private and general aspects of the slave.

In the history of Eastern culture and enlightenment, the descriptions of “O’z-*Own*”, “O’zlik-*own identity*”, “Men-*I*”, and “Menlik - *Self*” are divided into two. The first is human, the second is spiritual self.Since the human ego is formed on the basis of man's natural, that is, innate, lustful inclinations, the people of mysticism and blame have put forward the idea of radically reforming it, of forming a polished "I" free from animal and satanic lusts. And this is called spirituality - the second birth. This birth took place mainly through the training of a perfect pir or murshid in the process of traveling leech. YunusEmro's confession, “I have one, inside me”, belongs to me. In mysticism and theology, the experience of recognizing the greed, of the uncompromising struggle against the greed, has changed the way a person thinks about himself and his inner imagination.

“Man is afraid to know his inner world, says the Turkish philosopher Nuriddin Topchi. Therefore, at some point in his life, he avoids himself in a way that is different from the previous ones”[3:75].

However, in order to know who one is, to observe oneself correctly, one must try to overcome the feelings of fear, retreat, and hesitation.

According to the famous psychologist G. Gurjiev: “When a man begins to understand himself, he sees the horrors that he fears. He does not know anything about himself unless he becomes so afraid” [2: 180]. Sufis, dervishes, and theologians, on the other hand, have uncompromisingly studied the negative strengths and imperfections of the human body, creating a new doctrine of spirituality - the spiritual self. They believed that Jesus could not ascend to the heavens of the unborn malachite (purity, freedom, divinity). Based on this idea, Sufis and Sufis spoke of two things, the physical and spiritual birth of man. This birth and growth is achieved through the

knowledge of the body (Navoi emphasizes this, “Think about your body”), the knowledge of the greed, the strengthening of morals, the purification of the heart and soul.

Just as the science of being, greed, morality, heart, and soul developed into a broad exploration of self-knowledge and the essence of humanity, so did the development of mystical and mystical literature. By the twentieth century, the prestige and influence of anthropology in the arts had declined sharply, especially after literature had moved away from psychology and its interest in the spiritual world had waned. There is no need to distinguish between what is lust, what is spirit and beauty. Navoi often solves the new concept of “Menlik - *Self*” in three words. These are: lust, self, and fanaticism. The poet interprets the ending of the requirements of human “Menlik - *Self*” in a single rubai.

Nafsamrida har nechakitolping'aysen,

Ko'pgarchibutunluqtilasangsing'aysen,

Komistayunechaelg'ayoling'aysen,

Nafsingg'axilofaylakimting'aysen.

No matter how much you try to control your desires

Even though you want a lot of integrity,

How many hands do you want,

You listen to me against your desires.

Man can desire integrity; he can see himself as a whole person. But as long as his memory is the lust of lust and his memory is the devil, he cannot save himself from being crushed in the mill of breakage, lust, and greed. The famous Arab mystic A.A. Afifi writes: According to the IhwaniSafa, what is expressed as “I” and “you” is the existence of what each of us calls greed. There is no evidence for the existence of the greed, whether practical or theoretical, other than enlightenment”[1: 359]. The sages of the sect, on the other hand, have argued that the “I” is separated from the “you” and that when it is separated, it acquires a universal meaning. Because enlightenment is an inner knowledge born of the observation and pleasure of the heart. Enlightenment reflects the spiritual power, purity and privileges of the soul.

In the early Sufis, the word *fano*-death was used to mean the abandonment of self-consciousness and the elimination of certain qualities and characteristics of the “I”. Then, the main condition for being free from lust and attaining the revelation of Allah is stated. On one of the continents, Navoi writes.

Kimkio'zlukimoratinbuzdi,

Bo'ldinaqdifanomuzdi.

Ul imoratnibuzmayinsolik,

Bo'laolmasbunaqdg'amolik.

Who destroyed the building of identity?

It was clearly death.

Do not demolish the building,

It has no certainty.

Destroying the “building of identity” and gaining a cash fan is the acquisition of a powerful new spiritual “I”free from human qualities. The “building of identity” is, of course, lust. The pain of getting rid of it is the main pain in mystical literature. The famous orientalist R. Nicholson wrote,

“The Sufi poet wanted to say”, Drink wine to get rid of your lust, and leave your material existence in the midst of divine spectacle.' From the point of view of almost all representatives of mystical and mystical literature, the place and status of the human "I" and self is low, and the second - the spiritual “I” is very high. Because the first is human, that is, physical, material, physical, emotional, animal, and sensual. The second embodies spiritual, spiritual, occult, and spiritual qualities. Mysticism exemplifies the superiority of these two “I”. And the tax gave him the authority to find what he was looking for in a fan. Fano – *death*actually knows that there is nothing and that there is no boron. Existence, that is, the world man - was created from nothingness and will return to nothingness again. Therefore, one must first understand that there is a loss in achievement, an achievement in loss.It is then that he does not spend his life in ignorance, falling into the trap of raw and transient purpose, selfish interests and claims, as if he is bound to something and does not stop spiritually. “The supreme goal of BoyazidBistomi”, says Suleiman Ulutagh, “is to create an absolutely free identity, free from influence, interest, and danger, by going through an “*Men*-I” and a “*o’zlik*-self” [4: 153]. Thus, the Iranians, the poor, and the dervishes focused so much on the development of a free, active, independent self that they preferred to remain silent rather than speak or write until they were freed from the influence of lust. According to them, “The word is like wine that intoxicates the mind. Anyone who is addicted to drinking this wine will never give it up. Since the calamity of the word is known to the mystics, they do not speak at all until there is a real need. And they look very carefully at the beginning and the end of the word”[6: 503]. Such a precise attitude to words and thoughts is like a fairy tale today. The first sign of talent is to feel the word deeply, literally giving it a new life. A selfish poet, writer, scientist can never do such a thing.

Sufis and Sufis seem to need to dwell on another aspect of the worldview.

For centuries, the people of Adam have spoken of goodness, kindness, generosity, love, devotion, and encouraged others to acquire these qualities and attributes, but as time went on, the gap between goal and action increased. Those who succumbed to lies, deception, hypocrisy, and nonsense were disillusioned with words and speech. The people of Sufism, then, persevered and suffered not for the sake of propagating goodness and goodness, but for the sake of purifying the heart and mind from worldly sorrows and materialistic lusts, cultivating their morals, and expelling ignorance from their hearts”[5: 198].

Navoi always encouraged people to stay away from the people of the world, including materialists, worldly people, liars, swindlers and swindlers who never tired of changing their appearance depending on the situation and circumstances. The great thinker and poet wrote in a poem:

Fardbo'lkim ul kishidunyodabo'lmishahlitark,

Kim fanoyo'lidatarkiahlidunyoaylamish,–

The individual may leave the people of the world,

Who has left the world in the way of death, -in another, he says:

EyNavoiy, qilsangerdiofiyatkunjinVatan,

Munchamunglug'jonigg'aozorbo'lg'aymuedi, –

OhNavoi, if you did, the homeland of recovery,

I wish I could hurt so much, -he says.

Has the people of the world today, the people of the state, and the people of ignorance changed and become different than before? Consider this dream:

Muhandisetopayuegnimaqanotyasatay,

Uchubhavosidaqushlararoo'zumniqotay.

An engineer can find a wing on my shoulder

Tighten myself between the birds in the flying air.

If someone says that this feeling is stuck in the maze, that such an escape does not inspire anyone, then it is impossible to imagine how much the poet suffered and suffered in order to get rid of his human ego.

CONCLUSION

The principles of bravery, Sufism, rindiness, and blame have had a great impact on the realization of the dream of the peoples of the East to know themselves and create a new priestly "I". But the spiritual power and opportunity that united these teachings was a state of fanaticism and fanaticism. It is obvious that classical poets, in particular, Alisher Navoi, do not cover the concept of "I" and "*Menlik*-self" without studying it objectively.

What is even more useful is that the image of a mortal man, an animal, an angel in appearance, a devil inwardly, a friend in appearance, a secret enemy, helps to know the true nature of people and not to be deceived by unimaginable tricks.

The great Pakistani thinker and poet Muhammad Iqbal is a fan of the world, "I" is eternal. Nothing but me. It is hidden in your biography to cultivate the truth of self ...". In this sense, the study of Navoi's work is an inspiring, irreplaceable lesson.

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THE SUSTAINABLE DEVELOPMENT GOAL'S IMPLICATIONS

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ABSTRACT

The current major global environmental policies for a much more affluent world are the Sustainable Development Goals (SDGs), the New Urban Agenda (NUA), and indeed the Paris Agreement. The built environment has been recognized as a key contributor to biodiversity loss, and will therefore play a significant role in a future where environmental values are reinforced. Because people and nature are the primary victims of biodiversity loss, there should be a seamless connection between the built and natural environments. The purpose of this review article is to look at the relationship between the built environment, biodiversity, and the United Nations Sustainable Development Goals. The article examines the importance of a sustainable built environment in biodiversity conservation, which is critical for attaining the SDGs in general and SDG 15 specifically. The study employs a qualitative analytical method including a workshop of information creation with 16 professionals from government and business.

KEYWORDS: *Biodiversity, Built Environment, Construction Industry, Sustainable Development Goals, and SDG15.*

INTRODUCTION

Fabrication is the least sustainable industry, using almost half of the world's non-renewable resources. The constructed environment has been claimed to have a direct impact on the natural environment due to the quantity of energy and money required to maintain the company. It's also worth noting that greenhouse gases contribute to biodiversity losses in the built environment, reducing the ecosystem's ability to sustain living creatures. Natural and man-made ecosystems are intertwined, and this connection has a major impact on the planet. All living things, including plants, animals, fungi, microorganisms, and variations within or across species and ecosystems, are included in the term biodiversity[1].

The 2030 Sustainable Development Goals (SDGs) are intended to address global problems such as human well-being and environmental protection. The SDGs are interconnected, and in order to fulfill them, the planet's ecosystems and resources - land, water, and fresh air - must be taken into account[2]. The ecosystem services (ES) concept has a lot of promise for better planning, strategy, and decision-making. Understanding how various habitats (forests, rivers, wetlands, and

so on) connect to the social and economic advantages of grasslands is critical for long-term biodiversity protection and ecosystem sustainability. The Earth and Water Ecosystems are linked because human activities on the ground exert pressure on the water ecosystem, affecting the production of ES by rivers and lakes[3].

The Sustainable Development Goals (SDGs), which were adopted by all UN member states in 2015, are a bold strategy for achieving sustainable human development by 2030.

Mental health and wellbeing are particularly addressed under SDG 3, which stresses the inclusion of mental health treatment in universal health coverage, in contrast to the Millennium Development Goals. Because the worldwide human suffering and financial costs associated with mental illnesses are significant and increasing, including mental health in the SDGs is critical. 2,3 According to a recent return on investment study, investments in mental health treatment have the potential to improve the skills and productivity of afflicted people and families. 4 However, there is mounting evidence that mental illnesses are highly socially influenced in cultures throughout the world. The social and economic circumstances that have a direct impact on the incidence and severity of mental illnesses in men and women throughout their lives are known as social determinants of mental disorders. Adverse social and economic conditions, such as poverty, income disparity, interpersonal and communal violence, and forced migration, are all important predictors of mental illness. Because mental illnesses are so socially driven, increased access to mental health treatments is unlikely to alleviate the worldwide burden of these disorders[4].

In this perspective, by addressing upstream socioeconomic factors, the SDGs have the potential to decrease the burden of mental illnesses at the population level. To achieve this decrease, more clarity on which socioeconomic factors to target and how they relate to the SDGs is required. To present, there is relatively little unified data, especially from low- and middle-income countries, about the socioeconomic and violence-related variables that should be addressed for mental illness prevention. Although the SDGs aim to address a number of serious global issues, including violence, climate change, displacement, and economic inequality, little is known about how tackling these issues may prevent or decrease the prevalence of particular mental illnesses[5].

This research had two goals: first, to create a preliminary conceptual framework for the social determinants of mental disorders that is aligned with the SDGs; and second, to use that framework to systematically review evidence on the social determinants of mental disorders in order to identify potential mechanisms and targets for interventions that address these determinants. This endeavor necessitates gathering research material on the socioeconomic determinants of mental disease throughout the life cycle from low-, middle-, and high-income nations[6]. A strategy like this has the potential to improve alignment between the SDGs and reductions in the incidence of mental illnesses, as well as propose action across a variety of sectors. It may also show possible interaction mechanisms between socioeconomic variables and mental illnesses. As a result, there may be an opportunity to modify current poverty alleviation and violence reduction methods outlined in the SDGs to avoid the emergence of mental illnesses in communities[7].

In order for policy to be assessed, both at and within the SDGs, there must be dependencies between the objectives in terms of possible interactions. This problem is not new, and similar concerns have been raised in the past when attempting to link climate change adaptation to poverty reduction, achievement of the Millennium Development Goals, and balancing economic development, environmental sustainability, and social inclusion for human well-being. Because of the SDG framework's comprehensive nature, there are many potential linkages around the SDG system 169 that policymakers must examine[8]. Though a methodology for characterizing

SDG interactions has been suggested, there is presently no comprehensive, data-driven study of interactions between all SDG indicators. Such interactions may be classed as synergies or trade-offs in the broadest sense, and vice versa. This was tied together in a symbolic formulation of synergies and trade-offs based on the findings of a correlation study across official SDG indicators, nation accounting, and the full period for which data is available.

The following are the Sustainable Development Goals:

- No Poverty
- Hunger eradication
- Good Health and Happiness
- Education of High Quality
- Equality between men and women
- Sanitation and Clean Water
- Energy that is both affordable and clean
- Economic Growth and Decent Work
- Infrastructure, Innovation, and Industry
- Reducing Inequality
- Communities and Cities that are Sustainable
- Consumption and Production in a Responsible Manner
- Action on Climate Change
- Underwater Life
- Life on the Ground
- Institutions of peace, justice, and strength
- Partnerships for the Goals

As a result, the goal of our research is to offer the first comprehensive measurement of synergies and collaborations. Internal and external trade-offs, as they have in the past, inside and around the SDGs, at home and globally scaled. As a result, we emphasize the most often discovered trade-offs, highlighting the need for focused and transformational action to overcome previous patterns and provide the largest potential global advantages. The research also compares and contrasts possible synergies that are critical for future strengthening and cross-leveraging. The analytical approach for assessing SDG interactions provided here is a critical contribution to making it work in order to successfully implement the SDG agenda[9].

When it comes to infrastructure and housing developments, the Built Environment seldom considers the relationship between biodiversity and human well-being; biodiversity plans for sustainable urban expansion are rarely considered. Despite the built environment's negative impact on biodiversity, new construction projects or the restoration of existing assets have the potential to enhance the ecological value of most construction sites (Green Building Council). The built environment is a significant contribution to biodiversity loss and climate change due to the enormous amount of resources consumed by the building sector. As a result, it is proposed that the built environment will play a major role in resolving the biodiversity loss problem[10].

ROLE OF SUSTAINABLE DEVELOPMENT

➢ The Sustainable Development Goals And Biodiversity:

The Biodiversity Conference, held in conjunction with the Earth Summit in Rio de Janeiro in June 1992 (the 'Rio Convention'), established the foundation for worldwide biodiversity protection. The 2030 Sustainable Development Plan, on the other hand, lays the groundwork for shared objectives and priorities targeted at addressing society's current problems. Biodiversity contributes to ecosystem services that are critical to human well-being and economic activity, as

well as the achievement of the Sustainable Development Goals. However, it is critical to recognize that biodiversity preservation is deeply ingrained in the majority of SDGs.

SDG 15 has a significant effect on SDG 3 (Good Health and Well-Being), SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities and Communities), SDG 12 (Sustainable Consumption and Production), SDG 13 (Climate Action), and SDG 15 (Climate Action) (Biodiversity-Life on Land).

The Sustainable Development Goal 15 [12-15] is mainly concerned with the preservation and wise use of the planet's ecosystems and wildlife. Humanity's existence and improved quality of life are largely reliant on biodiversity. Human activities such as over-consumption of natural resources, however, are placing increasing pressure on biodiversity as a result of continuous urbanization.

SDG 15 is a global target set by the United Nations that must be achieved by 2030. (UN, 2015). For example, SDG 15 objective 15.9, which is relevant to SDG 1 (End poverty in all its manifestations), demonstrates the interconnected yet interwoven character of the SDG 15 and the other SDGs (UNDP, 2016). Over the next 15 years, the SDGs aim to build a sustainable world that offers people freedom and dignity while also preserving the environment.

Framework For Thought

We created a new conceptual framework that included the main socioeconomic causes of mental health problems and connected them to the Sustainable Development Goals. On the basis of existing epidemiological data, we first defined the major categories of social determinants of mental illnesses, including demographic, economic, neighborhood, environmental events, and social and cultural domains. The panel contains definitions for these domains. We developed these categories based on prior conceptual work on the socioeconomic determinants of mental health. 9 The domains were selected for their conceptual coherence and distinctness, as well as their ability to include both distal and proximal levels of impact on a person's mental health outcomes. Second, we compared these domains to the frameworks developed by the WHO Commission on the Social Determinants of Health to verify that all important components were included (for example, the use of a multilevel approach and the inclusion of a life-course dimension).

Finally, we matched the SDGs to the areas where they seemed to be the most relevant. When an SDG seemed to be important for more than one domain, the group of writers agreed on the domain for which it seemed most relevant. The conceptual framework was used to arrange the domains. Mental illnesses are influenced by both distal and proximal factors in each area, which are mediated by family-level and biological characteristics. 10 proximal variables refer to persons, things, or events in the immediate external environment with which the individual interacts that enhance or decrease the risk of mental illnesses, according to Bronfenbrenner's ecological approach. Distal factors are societal structural arrangements or trends that have an impact on population mental illnesses, and are often mediated by proximal variables. This paradigm aims to reflect the significance of an ecological approach10, as well as the complex multidimensional ways in which socioeconomic factors interact with major genetic markers to influence mental illnesses.

The following are the SDG 15 objectives:

15.1 By 2020, ensure that terrestrial and inland freshwater ecosystems, forests, wetlands, mountains, and dry areas are conserved, restored, and used sustainably.

15.2 Promote the implementation of sustainable forest management for all kinds of forests by 2020, including halting deforestation, restoring damaged forests, and significantly increasing afforestation and reforestation worldwide.

15.3 By 2030, aim to create a land degradation-neutral world by combating desertification, restoring land and soil, particularly land impacted by desertification, drought, and floods, and achieving a land degradation-neutral world.

15.4 By 2030, ensure the protection of mountain ecosystems, including biodiversity, in order to increase their capacity benefit, which is critical for sustainable development.

15.5 Take immediate and substantial efforts to prevent natural habitat degradation and biodiversity loss.

15.6 As agreed upon globally, encourage fair and equitable distribution of the benefits resulting from the use of genetic resources, as well as proper access to such resources.

15.7 Take immediate measures to stop poaching and trafficking of protected species of flora and animals, as well as illicit wildlife product demand and supply.

15.8 By 2020, implement measures to avoid and significantly minimize the effect of invasive alien species on land and aquatic ecosystems, as well as to manage or eliminate priority species.

15.9 By 2020, include ecological and biodiversity values into national and local planning, development, poverty reduction initiatives, and accounting.

Biodiversity and the Built Environment: An Overview

The developed environment has an impact on biodiversity, resulting in habitat loss and destruction. The built environment will play a key role in sustaining biodiversity; it is essential to have green urban areas in the built environment to preserve biodiversity and provide chances for people to interact with nature. The ecology and biodiversity are key components of the urban environment that contribute to a higher quality of life through enhancing catastrophe resistance. It is claimed that a holistic approach to a sustainable built environment improves overall quality of life. Beyond habitat and species protection, biodiversity offers social, cultural, and environmental advantages. The goal of biodiversity conservation should be to restore and improve the population of species and ecosystems today and in the future.

DISCUSSION

The urban environment, in general, and the building industry, in particular, have an important role to play in conservation of biodiversity, although this is not usually a top priority for the construction industry. The construction sector may also pave the way for putting biodiversity at the heart of long-term development. The effect of the built environment on biodiversity is creating climate change as a result of the loss of building ground cover. Biodiversity may also be incorporated into the built environment via the creation of green urban areas, such as solar farms, which can help to preserve urban biodiversity. The integration of biodiversity into new building projects will be a key component of the planning application process. In a built area, biodiversity may be found near rivers, parkland, street plants, gardens, and empty lots.

CONCLUSION

The study's goal was to look at the link between the Sustainable Built Environment and Biodiversity Conservation, which is at the heart of the Sustainable Development Goals. This paper looks at how to use sustainable building methods to improve biodiversity protection and promotion as a component of the built environment. The ability of the earth to adapt to climate change is strengthened by a built environment with integrated biodiversity, which improves air quality, flood protection, and people's general health and welfare in the community. It will need

political leadership at both the world and national levels in terms of policy direction, including new biodiversity protection laws.

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A REVIEW ON WHITE BIOTECHNOLOGY REQUIRES NEW BIOCATALYSTS

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ABSTRACT

"White Biotechnology," as it's known. The molecular tools developed by White Biotechnology are enzymes that catalyze certain activities inside living cells. When operating in an aquatic environment or under mild reaction conditions, enzymes are renowned for having high substrate specificity as well as enantioselectivity. And White Biotechnology uses microorganisms and enzymes to make a variety of chemical substances.White Biotechnology uses microorganisms and enzymes to manufacture a large variety of chemical products. Therefore, the demand for new and useful biocatalysts is steadily and rapidly increasing. We have developed methods for the isolation of new enzyme genes, constructed novel expression systems, and optimized existing enzymes for biotechnological applications by methods of directed evolution. Furthermore, we have isolated and characterized biocatalysts relevant for the preparation of enantiopure compounds.

KEYWORDS:*Biocatalysts, Directed evolution · Metagenomics · Overexpression.*

1. INTRODUCTION

The synthesis of a range of chemical compounds utilizing microorganisms is referred to as industrial or "White Biotechnology." White Biotechnology's molecular tools are enzymes that catalyze particular processes inside live cells. Enzymes are known for having excellent substrate specificity and enantioselectivity when working in an aquatic environment under moderate reactions. These properties suggest that they could be used as biocatalysts in the chemical sector to I catalyze chemical reactions for which no specific chemical catalysts are available, as well as (ii) conduct “green chemistry” by substituting environmentally friendly bioprocesses for chemical processes that require a lot of energy and produce a lot of toxic waste. Prof. Maria-Regina Kula, retiring head of the old Institute for Enzyme Technology on the Research Institute Jülich's campus, pioneered biocatalyst research and its bioactivities in Germany. I and II enzymes were identified and described in close collaboration with nearby Institutes of Biotechnology, and biocatalytic methods with both isolated enzymes and entire microbial cells were developed, which now play a major part in the biotechnology sector[1]. The continuous replenishment of the cofactor nicotinamide adenine dinucleotide (NADH) using the format dehydrogenase system in a membrane reactor is a well-known example of a biotechnological

application. The stereoselective reduction of ketones using alcohol dehydrogenases is utilized in industry in conjunction with a NADH-dependent leucine dehydrogenase to produce chiral alcohols. Professor Kula's old institution is now known as the "Institute for Molecular Enzyme Technology," and it is part of the newly established Center of Microbial Biotechnology (CMB). It includes the Helmholtz Research Center Juelich's Institutes of Biotechnology I and II, as well as the Heinrich-Heine-University of Düsseldorf's Institutes of Molecular Enzyme Technology and Bioorganic Chemistry. In the area of white biotechnology, the CMB represents a unique combination of scientific knowledge, molecular biological, chemical, and biotechnological techniques, as well as cutting-edge equipment[2].

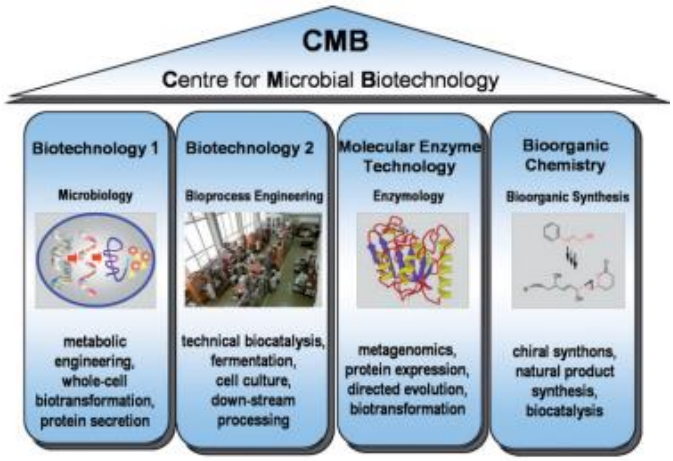

Figure 1 : illustrate the search and development within the Institute of Molecular Enzyme Technology[3]**.**

1.1.Biodiversity As A Source Of Potential New Biocatalysts:

Finding enzymes with novel and well-defined characteristics is sometimes like looking for a needle in a haystack. Biotechnologically interesting biocatalysts have been identified over many decades by growing the microorganisms that generate them in the laboratory. However, improved detection techniques have shown that only approximately 1% of all microorganisms found in an environmental sample can be grown under normal laboratory settings in recent years. The issue then emerged as to whether the genetic potential of non-cultivable microbes (up to 500 000 species in 1 g soil) might be exploited for biotechnology[4]. The metagenome is the entire DNA contained in a given environment (for example, a soil sample). The DNA from such a metagenome may be extracted directly, eliminating the requirement to grow microbes in the lab. The obtained metagenomic DNA is enzymatically chopped into acceptable fragment sizes, cloned onto appropriate vectors, and then injected into a heterologous host organism, most often the enterobacterium Escherichia coli. In this manner, so-called "metagenome libraries" are created, which are collections of thousands of clones that may be analyzed for specific enzyme activity[5].

1.2.Phototrophic Bacteria For A White Biotechnology That Is Sustainable:

Currently, anoxygenic phototrophic microorganisms like R. capsulatus, a Gram-negative purple bacterium, are seldom employed in biotechnological operations. In comparison to “conventional” microorganisms, phototrophic bacteria have a number of benefits. Under phototrophic growth circumstances, R. capsulatus, for example, utilizes sunlight as an energy source, combining energetic and anabolic activities in a highly efficient way. It is an excellent

model organism for future-oriented "phototrophic biotechnology" because of its metabolic capability. As a result, our objectives in the area of phototrophic biotechnology include the long-term generation[6].

- chemical compounds that are new
- bioenergy as well as renewable raw materials

1.3.Directed Evolution For The Creation Of Molecular Enzymes:

Enzymes are cellular biocatalysts that have evolved to fit their natural environment, which is typically an aqueous solution with a neutral pH, normal pressure, and moderate temperature. However, conversions using non-natural substrates including under non-natural reactions are often required when using biocatalysts in White Biotechnology applications. For example, in order to account for the stability of the products, the Oxynotidae catalyzed adding of hydrocyanic acid to alkynes must be performed out in an acidic environment. As a result, the pH stability of the enzymes must be modified. Another common issue is the insolubility of educts and products in water: a biocatalytic reaction must be carried out in an organic solvent, yet most natural enzymes are ineffective under these circumstances. Enzyme engineering may theoretically solve these issues; but, in most instances, such logical techniques of enzyme design are not applicable since 3-D structures are required, which are only known for a limited number of enzymes. Directed evolution is a different method that doesn't need any structural or functional understanding of the enzyme in question. In the lab, the natural concept of mutation and selection is achieved by combining a variety of random mutagenesis techniques with selection, or screening, to generate and discover enzyme variants with enhanced characteristics. Researchers have used directed evolution to develop enzymes with increased substrate specificity, thermo- and solvent stability, and enantioselectivity[4], [7].

1.4.Synthetic Chemistry's New Biocatalysts:

Product production may be catalyzed by isolated enzymes or entire cells, which can then be utilized as intermediates in a variety of chemical reactions. Table 1 lists some of the enzymes that have been discovered and described at the Institute of Molecular Enzyme Technology.

1.5.Enzymes That Produce C-C Bonds Include:

Enzymes that catalyze the production of carbon-carbon bonds are among the most important biocatalysts in the chemical industry. Biocatalysts that catalyze the motion of chiral building blocks for the production of bioactive molecules such as medicines are especially intriguing in this regard. Because various enantiomers of the same molecule may have quite distinct biological effects, it is now essential to synthesize both enantiomers of a chemical separately and test each one for its biological effects. Individual enantiomers are frequently difficult to produce using traditional chemical techniques. Because biocatalysts catalyze specific processes with strong enantioselectivity, they may address this issue[4].

2. LITERATURE REVIEW

Jemli et al. studied Enzymes are used in a broad range of industrial applications or processes, including food and beverage, animal feed, textiles, detergents, and medicine. Because their original forms do not satisfy the criteria for industrial use, enzymes screened from natural sources are often altered before hitting the market. Protein engineering is the process of creating new enzymes with particular functional characteristics, such as stability, catalytic performance, reaction product inhibition, as well as substrate selectivity. For enzyme engineering, two methods have been used: rational design and guided evolution. The strong and innovative methods for protein engineering that have been discovered so far provide great possibilities for the creation of industrial enzymes with particular characteristics and the manufacture of high-

value products at reduced prices. The goal of this review is to highlight the most important areas of enzyme application and to give an updated summary of past protein engineering research in which natural enzymes were changed to satisfy the operating parameters needed for industrial use[8].

Current difficulties and possibilities of white biotechnology are encouraging protein engineers to utilize a directed evolution method to create new and effective biocatalysts for a variety of applications, according to Ashwani et al. In the past, several techniques of enzyme engineering were employed in an effort to create enzymes with better functions and characteristics. With directed evolution studies, recent advances in the fields of random mutagenesis, screening, selection, and computational design have improved the flexibility and fast creation of enzymes under high selection pressure. Directed evolution techniques enhance enzyme fitness without requiring a deep knowledge of them, and they clearly show their potential importance in modifying enzymes for industrial application. Despite considerable progress in biocatalyst creation to date, there is still a need to enhance mutagenesis methods and create simple screening and selection technologies that do not need extensive human involvement. This study examines the fundamentals and key advancements in directed evolution techniques, as well as improvements in mutagenesis, screening, including selection procedures, as well as instances of enzymes created using these methods. Several widely used techniques for generating molecular diversity, as well as some newly employed tactics, are described, along with their benefits and drawbacks[7].

The chemical sector has a huge demand for innovation, according to Langer et al. More and more established chemical processes are being converted to biotechnological methods in order to save resources, energy, and time. White biotechnology is needed to find and develop new enzymes, biocatalysts, and applications. Because the cultivability of microorganisms residing in particular environments is limited, methods must be developed that provide access to the vast untapped wealth of microbial variety. Metagenomics has the potential to offer novel and varied enzymes, biocatalysts, and bioactive compounds, as well as make industrial biotechnology an economically and sustainably successful endeavor[9].

3. DISCUSSION

The synthesis of a range of chemical compounds utilizing microorganisms is referred to as industrial or "White Biotechnology." White Biotechnology's molecular tools are enzymes that catalyze particular processes inside live cells. Enzymes are known for having excellent substrate specificity and enantioselectivity when working in an aqueous environment and under moderate reaction conditions. Microorganisms and enzymes are used by White Biotechnology to create a wide range of chemical compounds. As a result, there is a steady and fast increase in the need for novel and useful biocatalysts. We've used directed evolution to create techniques for isolating new enzyme genes, building new expression systems, and optimizing existing enzymes for biotechnological uses. Despite the fact that the GDH/ADH system has the identical enzymes, the gene order on the plasmid is inverted. The cellular enzyme activity were significantly reduced by this design (1500 U/g cell wet weight). This finding showed that not only the expression of the enzymes themselves, but also their ratio, is essential.

The high cellular enzyme activity obtained in the majority of settings demonstrate the excellent quality of these whole-cell biocatalysts. These strains can carry out efficient asymmetric reductions, and all reactions have high enantioselectivities of > 99.9% enantiomeric excess. These ADH-catalyzed biocatalytic methods are classic examples of how to use white biotechnology to make chiral chemicals with high optical yields and under moderate reaction conditions.

4. CONCLUSION

Various prochiral ketones were utilized as substrates in whole-cell bio transformations after the whole-cell biocatalysts were constructed and characterized. The typical substrate of ADH from L. kefir, acetophenone, is given below as an example. The specific cell activity produced by reducing 10 mMacetophenone utilizing the various systems ranged from 1 to 3000 U/g cell wet weight, with the ADH/GDH system providing by far the highest yield. Despite the fact that the GDH/ADH system has the identical enzymes, the gene order on the plasmid is inverted. The cellular enzyme activity were significantly reduced by this design (1500 U/g cell wet weight). This finding showed that not only the expression of the enzymes themselves, but also their ratio, is essential. The high cellular enzyme activity obtained in the majority of settings demonstrate the excellent quality of these whole-cell biocatalysts. These strains can carry out efficient asymmetric reductions, and all reactions have high enantioselectivities of > 99.9% enantiomeric excess. These ADH-catalyzed biocatalytic methods are classic examples of how to use white biotechnology to make chiral chemicals with high optical yields and under moderate reaction conditions.As a result, there is a steady and fast increase in the need for novel and useful biocatalysts. We've used directed evolution to create techniques for isolating new enzyme genes, building new expression systems, and optimizing existing enzymes for biotechnological uses. Also identified and studied biocatalysts that can be used to make enantiopure chemicals.

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HYDROGELS: A REVIEW

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ABSTRACT

Until 1960, Poly HEMA was generally neglected. Hydrogels have been in nature since the beginning of time. The polymerization of HEMA and crosslinking agents in the presence of water and other solvents has led to the emerging area of biomedical hydrogels. This article tries to summarize the research that have been done on the categorization, implementation, and management of the selectivity option for hydrogels. The next generation of super porous hydrogels (SPHs) and super absorbent polymers (SAPs) has been highlighted as a suitable mild technique for the study of solution-dependent phenomena. Hydrogels, also known as smart and/or hungry networks, are presently the focus of much scientific research due to their promise in high-tech applications in the biomedical, pharmaceutical, biotechnology, bio separation, biosensor, agricultural, oil recovery, and cosmetics sectors. Smart hydrogels show a significant physiochemical transformation in response to small changes in the environment. Such changes, on the other hand, are reversible; following a reaction, the hydrogels may return to their original form as soon as the catalyst is removed.

KEYWORDS: *Applications, Classifications of Hydrogels, Glucose, Ph, Stimuli, Temperature.*

INTRODUCTION

Hydrogels are a three-dimensional network of polymers made from natural or synthetic materials that have a great degree of flexibility due to their high water content. They may be able to hold a large quantity of water or biological fluids under physiological circumstances and have a soft rubbery consistency comparable to living tissues, making them an excellent material for a variety of applications[1]. Hydrogels having properties such as desired functionality, reversibility, sterilizability, and biocompatibility satisfy both cloth and organic needs to treat or replace tissues and organs, as well as to interact with biological devices. Hydrogels have been discovered in nature as a result of life on the planet. Bacterial biofilms, which are hydrated extracellular matrix additions, and plant structures are both examples of water-swollen motifs[2].

Early in human records, gelatine and agar were also recognized and utilized for various purposes, but the present records of hydrogels as a category of substances intended for biological programs can be traced. Poly (2-hydroxyethyl methacrylate) (polyHEMA) was mentioned in this

article. In a nutshell, it was described as a tough, brittle, and glassy polymer that was genuinely no longer taken into account of significance. Poly HEMA was mostly ignored after that publication until 1960. In the presence of water and other solvents, Wichterle and Lim reported the polymerization of HEMA and crosslinking marketers. They created a smooth, water-swollen, elastic, and transparent gel in lieu of brittle polymers. This breakthrough paved the way for the current field of biomedical hydrogels as we know them today. Following then, the number of different hydrogel formulations gradually increased over time[3].

This review looks at how hydrogels are used in a variety of areas, including biomedical, biotechnology, pharmaceutical, and separation era disciplines. The clever hydrogel provides a platform for a variety of applications, including micro fluidic control, biomimetic, biosensor/bio actuator, and sorption ability, thanks to its fantastic properties, such as reversible swelling/dispelling behaviour, excessive environmental sensitivity, excessive ionic conductivity, excessive permeability, floor homes, novel mechanical residences, and sorption ability. According to this evaluation, hydrogels can be processed in a variety of ways, including the traditional one-step method of direct polymerization of the multifunctional monomer by crosslinking or multistep tactics, in which the primary polymer is synthesized with precise useful agents and then reacted with a crosslinking agent, as suggested by Ahmed. To reveal the most mechanical strength, chemical homes, Stimuli reaction, density, biodegradation, and biological and environmental response, unique medical procedures for developing and processing a particular hydrogel for a given application are needed. Solution polymerization and suspension polymerization are the most common methods for creating a variety of hydrogel networks with molecular scale control over shape, as well as crosslinking density, initiator, emulsifier, and response situations, as well as tailor-made properties such as chemical, physical, and organic reaction to stimuli, mechanical strength, biodegradability, and solubility.

Superabsorbent polymers (SAPs) were introduced and extended to sectors where water preservation capacity became a significant problem around three years ago. Amazing porous hydrogels (SPHs) were discovered in 1998 to have greater elastic elasticity, mechanical strength, and water upholding potential than other types of water absorbent polymer devices. This assessment provides a comprehensive review of SAP and SPH development and differentiation, as well as a comprehensive course for fabric engineers to process a hydrogel of their own design[4]. Due to their purity, high absorption capacity, well-described structure, properly-described functionality, degradation, and stability in different tiers of pH, temperature, strain, and enzymes, artificial polymers have replaced herbal polymer hydrogels. As a result, the number of herbal and synthetic polymers available increases, as do their categories[5].

Concept Of Hydrogels

Classifications Of Hydrogels

The physical properties of hydrogels are determined by their physical properties, swelling characteristics, guiding method, origin, ionic fees and resources, biodegradation cost, and crosslinking location. The crosslinking process in physical gels has a physiological aspect[6].

Hydrophobic association, chain aggregation, crystallization, polymer chain complexion, and hydrogen bonding are some of the physiological methods used to accomplish this. To make a chemical hydrogel, a chemical technique called chemical covalent crosslinking (simultaneously or set up polymerization) is used. Chemical hydrogels are eternal and irreversible due to configurational changes, while physical hydrogels are reversible due to conformational modifications. Another kind of hydrogel is the twin-network hydrogel, which is created by combining physical and chemically crosslinked hydrogels via an electrostatic connection. It has recently been recruited to overcome the risks of completely relying on physical or chemical hydrogels with a strong liquid absorption capacity across a wide pH range and a greater

sensitivity to pH changes than chemical hydrogels. Few researchers have recently suggested another twin-community consisting of graphene-polymer composites with improved mechanical characteristics and self-recovery capability[7].

Hydrogels

Hydrogels that react to environmental stimuli show unexpected changes in their growth movements, community structure, mechanical strength, and permeability, earning them the moniker "environmentally sensitive, smart hydrogels." Light, tension, temperature, electric fields, magnetic fields, mechanical stress, and the strength of many electrical resources are examples of physical stimuli that alter molecular interactions at critical start points. Chemical stimuli include pH, ionic elements, and chemical agents, all of which affect the interactions of polymer chains with solvents and between polymer chains at the molecular level[8].

Any other splendour, referred to as dual responsive hydrogels, is the result of combining two Stimuli responsive mechanisms within a single hydrogel system[9]. A dual responsive polymer machine is made up of Polyacrylic acid and co-polyvinyl sulfonic acid. The reactions to ligands, enzymes, antigens, and other biochemical agents constitute a biochemical stimulus. Stimulus sensitive hydrogels are thus appealing biomaterials for pharmacological, medicinal, and biotechnology applications[10].

Hydrogels that respond to pH

Patel and Mequanint developed polymeric hydrogels with ionic pendant structures that may accept or give protons in response to a pH change in the environment. The degree of ionization, known as pKa or pKb, is significantly altered in a pH sensitive hydrogel at a certain pH. This fast shift in the net fee of the ionized pendant organization produces an abrupt quantity transition by creating electrostatic repulsive interactions between the ionized organizations, resulting in a large osmotic swelling pressure. Anionic and cationic hydrogels are two types of pH sensitive hydrogels. Anionic hydrogels contain carboxylic or sulfonic acid pendent agencies, which deprotonate when the pH of the environment exceeds the pKa, resulting in the ionization of the pendent businesses, which enhances the swelling of the hydrogel. Cationic hydrogels, on the other hand, include pendent corporations and amine corporations, in which ionization occurs below the pKb, causing swelling due to increased electrostatic repulsions.

Hydrogels That Respond To Temperature

Temperature-sensitive hydrogels are identified by their capacity to swell and contract when the temperature of the surrounding fluid changes, implying that the swelling and deswelling behavior is mostly determined by the ambient temperature. Hydrogels that respond to temperature may be classified as either positive or negative temperature responsive structures.

Hydrogels That Respond To Glucose

Appropriate insulin shipping hydrogel architectures must be created for diabetes treatment in order for the glucose-sensing provider to activate the release of insulin. Insulin carriers and glucose oxidase combinations with glucose sensitive hydrogels are attractive. HEMA and PMA are examples of "bio-clever" fabrics in which designed molecular reputation is combined with actuation, according to Podual and Brahim et al. The system's pH is lowered when glucose is converted to gluconic acid by glucose oxidase in the presence of oxygen, causing cationic hydrogels to expand and insulin to be released. Glucose oxidase has been covalently bonded to the hydrogel machine to minimize its rapid diffusion out of the device and enhance the regulated loading of insulin.

Hydrogels Have Several Uses

Hydrogels are a significant collection of resources with excellent technical, biological, and medicinal applications. Polyelectrolyte hydrogels are particularly useful because they transport or expand fees along the chain and bind with oppositely charged species to form complexes, highlighting their numerous applications in drug shipping, protein, peptide, insecticides, nutrients, hormones, agriculture, horticulture, biotechnology, and cell creation, pharmaceutical and biomedical packages. Cationic polymers are gaining popularity in the synthetic industry because they can break down large structures into smaller ones and cover high DNA charges, which are required for transfecting a wide range of cell types, gene, antisense, and bile acid sequestrates, as well as growing viral and non-viral vectors for DNA and oligonucleotide delivery. Hydrogels exhibit a large number of changes in response to minor changes in their environment, such as changes in the electric field, magnetic field, solvent, pH, ionic energy, and temperature.

Physically cross-linked hydrogels

Fundamentally cross-linked hydrogels, also known as reversible gels, have gained popularity owing to their relative simplicity of manufacture and the fact that they do not need the use of cross-linking agents during the synthesis process. Physical interactions between various polymer chains inhibit the dissolution of physically cross-linked gels. Because cross-linking agents are usually avoided in culinary, pharmaceutical, and biomedical applications, choosing the right hydrocolloid type based on concentration and pH may result in a wide range of gel textures.

The following are some of the techniques for making physically cross-linked hydrogels that have been described in the literature:

a) Freeze-thawing: Physical cross-linking may be accomplished by repeating freeze-thaw cycles. The development of microcrystals in the structure occurs as a result of freezing and thawing. Poly hydrogels made by freezing and thawing are a common example. These hydrogels, which are held together by hydrogen bonds, are more porous, spongy, rubbery, and elastic than PVA hydrogels made by conventional techniques. These gel matrices are now widely used in biotechnology, particularly in the immobilization of molecules (proteins, peptides) and entire cells.

b) Stereo complex formation: In recent years, hydrogels for drug delivery systems based on stereo complex formation have been developed. The main benefit of this method is that it is simple to make a hydrogel by dissolving each component in water and combining the mixture. PLA is an excellent example of a stereo complex that has good stereo complex characteristics. PLA's capacity to create stereo complexes was discovered for the first time. However, one major drawback of stereo complexation is the limited variety of polymer compositions that may be utilized.

c) Ionic interaction: Hydrogel systems are made up of ionic polymers that have been cross-linked by the addition of di- or tri-valet counter ions. The concept of gelling a polyelectrolyte solution with multivalent ions of opposing charge is based on this technique. Chitosan-glycerol phosphate salt and poly-[di(carboxylatophenoxy) phosphorene calcium salt are two examples of hydrogels in this group.

d) H-bonding: Hydrogen bonding interactions may be used to create physically cross-linked gel-like structures. The creation of a hydrogen-bond CMC (carboxymethyl cellulose) network by distributing CMC is the greatest example of such a hydrogel. The sodium ions in CMC were replaced by hydrogen in the acid in this procedure.

Maturation (heat-induced aggregation) is a heat-induced aggregation process that results in the creation of a hydrogel with finely organized molecular dimensions. The heat-induced gelation of gum Arabic is the greatest example of this hydrogel system. The phenomena are caused by the

aggregation of gum Arabic's proteinaceous components, which is produced by heat treatment. As a result of the aggregation, the molecular weight increases, resulting in the formation of a hydrogel with enhanced mechanical characteristics and water binding capacity.

Hydrogels That Have Been Chemically Crosslinked

Covalent bonding occurs across various polymer chains in chemically cross-linked hydrogels. As a result, unless the covalent crosslink sites are cleaved, they are stable and cannot be dissolved in any solvent. Due to the difficulties in decoupling factors such as gelation time, internal network pore size, chemical functionalization, and degradation time, the design flexibility of a physically cross-linked hydrogel is limited. Chemical cross-linking, on the other hand, produces a network with a high mechanical strength and, depending on the kind of chemical bonding in the building blocks and crosslinks, relatively long degradation periods.

The following are some of the techniques for making chemically cross-linked hydrogels that have been described in the literature:

a) Cross-linking via chemical means

b) Grafting Hydrogel preparation

c) Polymerization by radicals

d) Reaction of condensation

DISCUSSION

Without either an uncertainty, polymeric hydrogels have a number of important properties that qualify and allow them to show exceptional characteristics, allowing them to be used as vital instruments in virtually all sectors, including biomedical, agricultural, industrial, and environmental applications. Significant changes are made from time to time to revolutionize the area of hydrogels for their wide range of uses. Polymeric hydrogels, which correspond to current generations of materials, have been thoroughly studied in this study, and their technological applications have been briefly addressed. Recent developments in hydrogels have revolutionized current research in areas such as drug delivery systems, electrical conductivity, water purification, agricultural sector, decontamination of organic waste, and so on, and these developments are presented in this comprehensive review of the various types of hydrogels such as superabsorbent hybrid hydrogels, Conducting polymer hydrogels, Polyline hydrogels, and so on, and these developments are presented in this comprehensive review of the different types of hydrogels such as super absorb

CONCLUSION

This review examines the literature in the field of hydrogels over the last two decades, focusing on the classification of hydrogels based entirely on their unique physical and chemical properties, with a focus on stimuli responsive hydrogels for biomedical, environmental, and industrial applications. The technique of creating hydrogels and the design system have an impact on the production of hydrogels via several methods that need and specify a high level of sensitivity. The path taken by the research in this review demonstrates that the combination of polymers that react to different stimuli must be identified, and future generations of hydrogels that spontaneously swell when in contact with lungs and cancer cells must be explored. SAP and SPH, a progressive and ecologically friendly category, are new materials that expand quickly to a huge length regardless of their initial length and display beautiful houses, worldwide connections, and are easily recognized. The compounds tend to take in a lot of water or aqueous fluids in a short amount of time. Researchers interested in ion impregnated and altered selectivity in the future will be very interested in this new category. Miniaturization of these hydrogels with more desired durability, mechanical properties, and biocompatibility for brand spanking new

applications is required in this era of nanofabrication. As a result, determining medical requirements while also minimizing the complexity of the hydrogel technique will be the main objective for the foreseeable future.

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DEVELOPMENT DIVISIONS OF UZBEK CINEMA

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ABSTRACT

At the end of the twentieth century, a device was invented to film moving objects, people, and animals - in general. The name of this apparatus is derived from the Greek words cinematic motion and graph and is called cinematography. Since then, the art of cinema has found the art of making new films.

KEYWORDS:*Cinema, Art, Literature, Theater, Aesthetics, National, Film Essay, Work, Plot.*

INTRODUCTION

The art of cinema is the creation of a work by re-imagining the events of life on their own or in the absence of a special instinct, by means of multiplication. The art of cinema is an important tool in shaping the taste of remembering the ethnic perspective of the audience's depiction of events. Uzbek filmmakers X. Devonov portrayed real life in his chronicle films, which consisted of films made in Central Asia for 191 years, ranging from films to Oriental American exotics. In 1924, the Bukhara CompanyBukhkino was established, and in 1925, the SharqYulduzi film factory was established in Tashkent and began the development of Uzbek art. In the early years of Soviet rule, Soviet cinema in general was based on a chronicle of Uzbek cinema. Russian filmmakers K. Gertel, M. Doronik, Ch. Sabinsky, O. Fereliksky and others greatly contributed to the emergence of Uzbek feature cinematography. N.Ganiev, the assistant to the Russian filmmakers who created the first films of the SharqYulduzi film factory, founded the Uzbek national cinema. Actively participated. The emergence of sound cinema in the 1930s increased the artistic value of the art of cinema. "The creation of the film Kasam (directed by A.Usaltev in 1934-7) ushered in the era of sound films in Uzbek cinema. The development of sound cinema has further strengthened the ties of Uzbek cinema with advocacy and theater.

Film music is a genre of music associated with the formation and development of cinematography, which was originally designed to suppress the noise of the cinema apparatus. Gradually becoming an important tool of film dramaturgy, special music is usually written for each film. Sometimes it is expressed from the existing music. Soviet composers S. Prokofiev, Dunesky Multiplication are also used. Cinematographic music is inextricably linked with the plot, the emotional experiences of the voices, dramatic situations, contradictions and so on. Film and music cooperation has been established in Uzbekistan since the 1920s. As a genre, film music began to take shape in the second half of the 1940s. In writing music for the first Uzbek films, V.A. Uspensky, A. Kozlovsky used Uzbek folk melodies and songs and works by Uzbek

composers. For example, “Ravot songs” 1927 – “Tokhir and Zuhra 1945” and others In many Uzbek films created in recent years, the East is used as a means of dramatic development. For example, Abu Ali Ibn Sino (composer M. Burhanov 1957), Furkat (composer S. Yudakov 1959), Hamza (composer K. Akbarov, 1961) and other films play an important role in film music. For example. In 1959, the composers K. Akbarov, M. Бурхонов, M. “I was fascinated” created by Levnevs, in 1960 the composer M. Levnev’s “Mahallada duv-duv gap” and others. Music plays a major role in musical comedies, historical biographies about composers, conductors, singers, as well as film concerts, film operas, choreographic films.

In a cartoon, music has a special meaning. In it, the image is exchanged on the basis of educational rhythm, and the pictures are processed according to the finished music phonogram. In the interpretation of the image, the artist creates taking into account the nature of music (Abulqosimova:1999,p.23).

The first film in Uzbekistan was shown in 1897 at the Old Jova Square. Since 1908, foreign films have been shown in Tashkent, Samarkand, Kokand and other cities. The films shown in Central Asia consisted mainly of films influenced by the eastern exotics of America, France. The first cinematographer Khudoibergan Devonov in his first documentaries described the traditions of the Uzbek people, the landscape of Khorezm.In 1924, the Russian Bukhara company Bukhkino, and in 1925, the establishment of the Sharq Yulduzi (Uzbekfilm) film factory in Tashkent (1935) began the development of Uzbek cinema. However, due to the lack of national staff, attempts to set up a studio and organize regular photography at the Bukhkino company failed. The arrival of filmmakers in the Tashkent studio and their low level of professionalism did not allow them to create films of real national content. The films they created were only exotic and propagandistic in nature. The film began with the use of national prose and drama. The creation of a film based on scripts written by Russian experts themselves was a huge loss for the national cinema. It did not take shape for many years. Its formation as an “Uzbek national cinema” was impenetrable.

The content given in the silent films reflects to the audience more the point of view of the speeches of European experts, because the foundations of the authors, far from knowing the national traditions, were created in this spirit. Films from the 1920s, such as “Umbrella Carriage”, “Cunning Claw”, and “Chodira” are among them (Abulqosimova:1999,p.27).

The emergence of sound cinema has also increased the artistic value of Uzbek cinema. The first Uzbek sound film, “Qasam”, details the national acting culture, Uzbek life and psychology. “Nasriddin in Bukhara”(1943) revealed the real potential of the folk theme, showed how to build a beautiful and expressive series of visual aids, created a high level of performance. “Tohir and Zuhra” “broke” the boundaries of films based on folk tales, laid the foundation for the creation of historical films, allowing to feel the breadth of expressive play in the national spirit. The film “Tokhir and Zuhra” served as an important basis for the creation of the film “Alisher Navoi” (directed by K. Yormatov in 1947). Also, such artistic centuries as “Boy ila Xizmatchi”, “Kutlug Kan”, “Shohi sozana” were screened.

In Uzbek cinema, young people have formed a new view of modern requirements, moved away from the old stereotypes and assumptions, and have the opportunity to look at the world in a poetic way. At the same time, it came to be a page of educational value for urban boys and girls who knew that life consisted only of love, rejoicing, dancing in cafes, and dressing beautifully. This is especially true of director E. In Eshmuhammedov's works (Nafosat (1966) and Sevishganlar (1969) and others) he stood out. “Maftungman”, “Mahallada duv-duv gap”, “Sen yetim emassan”, “Kalbingda ko’z yosh”, “Tashkent non shahri”, “Sinchalak”, “Oxirgi kun”, “Ulugbek yulduzi”, “Natasha” and other films (Axmedova:2000,p.30).

Historical-revolutionary films ("The Destruction of the Black Consul") as a result of a new look at the accumulated experience of national filmmakers in the organizational and creative work, increasing the demand for screen art. In addition to The Seventh Bullet, a number of contemporary films have been made. They are "Violence", "Summer Rain", "Disaster Underfoot", "Tragedy of Love", "Fiery Trails", "Bitter Bean", "Other's Happiness", "Man Follows Birds", "Duel Under the Maple" and others. There are also "Nodirabegim", "Abu Rayhan Beruni", "Fiery Roads", "Shumbola" and others, which tell about the life of great scholars (National encyclopedia of Uzbekistan:2002,p.35).

In order to expand the research of Uzbek cinema, he sought to create films that more deeply and vividly reflect the social processes taking place in society. The screen has risen another notch in terms of quantity and quality, while genres have grown in form and content. Their diversity has increased. There seemed to be an escape from the usual content that had fallen into the mold.

"Alibaba and the Forty Thieves", "Here's That Boy Back", "Golden Wool Sheep Skin", "Awakening", "Disobedience", "Password", "Regina Hotel", "Armon", "Suyunchi", "Bride's Revolt " ,"The Case of Maysara","In the Dream"and other films are distinguished by their superior aesthetic quality and new forms (National encyclopedia of Uzbekistan:2002,p.603).

Uzbekistan Popular Science and Documentary Film Studio - short and full-length documentaries. The film studio, which produces chronicle scientific and popular films, was separated from the Tashkent Feature Film Studio in 1932. The first films consisted of chronicles and film sketches dedicated to the life of the republic. The first soundtrack was made in 1933 "Oasis in the Kizilkum"

The film studio joined Uzbekfilm in 1948, became independent in 1964, and in 1970 a branch of the Karakalpak ASSK was established. Nowadays, the social prestige of cinema has increased. The range of topics has expanded, with an increase in the number of works by local writers. Folklore, historical, contemporary and philosophical themes were reworked. "Women's Kingdom", "Scorpion", "Parimomo", "and Mother" and others are the latest films of recent years.

The founder of Uzbek cinema, N. Ibragimov, introduced world art to the world. Ganiev, People's Artist K. Yormatov's work will remain a bright page in the history of Uzbek cinema. Also, Y. A'zamov, Sh. Abbosov, L. Faziev, L. Sobitov, R. Botirov, A. Xamroev, A. Qobilov, Q. Kamalova, L. Musaqov, I. Ergashev, N. Faziev, A. Pann, M .; Krasnoyarskiy, A. Mukarramov, A. Penson, D. Fatxullin, A. Ismoilov, L. Gravitskiy, D. Operators like Abdullayev have made an invaluable contribution to the development of national cinema and its place in the world cinema. In addition to Uzbekfilm, there are such film studios in Uzbekistan as Vatan, Imon, Inson, Yogdu, Dostonfilm, Samarkandfilm, Shod and Yulduz. Uzbek documentaries date back to the 1930s. F. Nazarov, Yu. Gasilov, V. Dimkoviskiy, K. Alikaev, M. Kovrat, N. Ganiev, Yu. Azamov and others worked with high spirits in the early years of documentary film and achieved educational success. Physical training in production "Wonderful work", M. Kayumov's films "Victory of Uzbek Cotton Growers", "Holiday of the Uzbek People", "Big Fergana Canal", "Strong Stream" were highly appreciated. In particular, the film "Tashkent Textile Combine" (1938) won a gold medal at the World's Fair in New York (Issues of art criticism:1998,p.103).

During the war, feature films such as "To Friends at the Front", "Gift to the Front", "5th Republican Concert" were made.Post-war documentary filmmakers began their careers with enthusiasm and courage. Bright and lively films have been made, such as "The City with Four Gates", "Come to Uzbekistan", "Five Hands of Mankind", "Farkhod Lights", "Soviet Uzbekistan".Subsequent documentaries reflected the factories and plants being built in Uzbekistan, hydropower plants, the development of nature reserves, the life and work of science and art devotees, artistic achievements, major international competitions. "From spring to

spring", "13 swallows". "Teacher", "Gas and Chemistry of Uzbekistan", "People of the Blue Fire", "On the Road and in the Motherland", "The Story of Ashurov", "Frankly" and others.

M. Kayumov's many years of work are a separate page in the history of Uzbek documentary cinema. Who created side by side with him. Sh. Zoxidov, G. Nodirov, A. Saidov, O. Tursunov, N. Ataullaev, R. Rasulov, M. Arabov, A. Yoqubov, N. Rakhimova's contribution to the development of documentary cinema is great.In recent years, Uzbek documentaries have become more balanced. The range of topics has expanded. Films have been made that are in tune with life. The older generation was replaced by new young directors, cameramen, screenwriters and other professionals. "Sharof Rashidov", "Abdulla Qodiriy", "Pain", "Islam Karimov in the early 21st century", "Spring of Uzbekistan", "Gold of Uzbekistan", "Bread", "Road to the World", "Armed Forces of Uzbekistan", "Furkat" and others are the best films of recent years. In the development of modern documentary film D. Salimov, B. Muzaffarov, Sh. Maxmudov, Sh. The role of Kurbanbaev and others is different.Cartoons such as "Mysterious Box", "Mercy and the Beetle", "Winter Tale", "City Frogs", "Magic Samovar", "Apple Tale" cover various topics.Over the next decade, animated films created in a variety of genres provided the next-generation development. "Bahrom and Dilorom", "Pile", "New old fairy tale", "Flowers in the field" and others are among them.For many years, Uzbek Film has been served by a dubbing team that translates the world's best films into Uzbek and delivers them to the Uzbek audience. One of the founders and active participants in this industry is Q. Мирмухаммедов, M. G'aniev, S. Saidov, B. Xaydarov, S. Iskandarov, J. Obidov, B. Kutyakov, A. Sharanovs can be shown.The issues of cinematography are dealt with by the Art Research Institute. Filmmakers N. Prepared at the Ganiev Film College and the Tashkent Institute of Arts. The Union of Cinematographers of Uzbekistan (1962-1969 Association of Cinematographers of Uzbekistan) has had a House of Cinematographers since 1996 and a Museum of Cinematography since 1972.It should be noted that in the late 80's, as a result of the process of building privileges and the formation of a number of independent states in the early 90's, many young artists entered the art of cinema with new themes, new heroes and new creative pursuits. Most of the films made during this period are devoted to contemporary topics, and they are mainly dominated by evaluation criteria. The tradition, based on such a socio-critical analysis, was decided at the political level as a result of a reassessment of the recent past. The socialization of artistic observation was observed in the films "Who are you", "A trap for rabid dogs", "One step to the right, one step to the left", "Until dawn", "The back of the moon". However, such a revival in the modern theme began to fade slowly in the second half of the 1990s. In the historical moments of Uzbekistan's independence, the ability to communicate directly with its time and audience, to target the existing problems in the process of reforms in key areas of the nation's life, began to push the art of cinema to the forefront of public life. The process of reviving the spiritual heritage, understanding the national culture has attracted the attention of filmmakers to the history of the distant and recent past, the themes and personalities that were once hardened into a layer of forgotten values. This, in turn, weakened his interest in contemporary topics and pushed him aside for some time. By the end of the 90s of the 20th century, the number of films about the present, the current events and the life of our people has decreased.

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TREATISES OF ORIENTAL SCHOLARS ON THE PERFORMING ARTS

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ABSTRACT

The theoretical views of Eastern scholars were formed on the basis of existing experience in the performing arts, and in their treatises they provided detailed information about the role and importance of music in society. Al-Husayn's (15th century) pamphlet "Musical Canons" provides information about the dutar, a two-stringed musical instrument that is widespread among the peoples of Central Asia. Qutbiddin al-Sherazi (1236-1310), known as an Iranian music theorist, made exemplary comments on the bowed tanbur in his treatise and considered the human voice to be the most pleasing of musical instruments.

KEYWORDS:*Work, Music, Instrument, Performance, String, Science, Melody, Tanbur, Flute, Rubob, Dust, Law.*

INTRODUCTION

Al-Farabi's (873-950) "Book of Great Music" ("Kitab al-musiqa al-kabr"), Ibn Sina's (980-1037) "Book of Healing" ("Kitab ush-shifo") encyclopedia –Khorezmi's (X century) "The key to knowledge", Sayfuddin Urmavi's (1216-1294) "The book about nobility" or "The book of Sharofiya", Jami's (1414-1492) "The treatise on music" contain important information about music performance and folk instruments given Sayfuddin Urmavi is known as a talented oud player, singer, and famous musician (Rosenshild:1969,p.33).

He was born in Urmavia, Azerbaijan. Sayfuddin's greatest achievement was that he developed a perfect system of modes. Ibn Zayli's (Complete Book on Music) (Kitab ul-kabir fil-musiqiy) (died 1044) is his only and invaluable book in musicology. He developed a new way of expressing moods in letters in music. Abdukadir Maroghi (15th century), Abdukadir ibn-Royibi (Maroghi) was born in the city of Marog in Azerbaijan, but spent the second half of his life in the palace of Timur - in Samarkand and died in Herat. In his pamphlet The Collection of Tones in the Science of Music (Jami al-alhan fi-ilm al-musiqiy), he enriched the doctrine of music with information about the existence of a kind of musical instrument, such as the kamoncha, the seven-stringed gijjak (National Encyclopedia of Uzbekistan:2000,p.53).

Al-Husayn's (15th century) pamphlet "Musical Canons" provides information about the dutar, a two-stringed musical instrument that is widespread among the peoples of Central Asia. Qutbiddin al-Sherazi (1236-1310), known as an Iranian music theorist, made exemplary comments on the bowed tanbur in his treatise and considered the human voice to be the most

pleasing of musical instruments. Darvish Ali, a musicologist from Bukhara who lived in the 17th century, gave detailed information about musical instruments such as tanbur, chang, kanun, rubob, kobiz, gijjak.

The legacy of the thinkers of the Great East also has historical value in the study of folk instruments. The famous work of Abu Nasr Muhammad Farobi "Kitab al-musiqa al-kabir" ("The Great Book of Music") is of great importance. In this book, the medieval scholar distinguishes between two types of musical performance: the resonance of melody in the human voice (the art of singing) and the playing of instruments. As a talented performer, Farobi focused on the role of musical instruments in the life of society, and wrote:

The above opinion of Farobi proves that the instruments played a leading role not only among the courtiers, but also among the townspeople and artisans, as well as in the musical culture.

The second part of the book is entirely devoted to the musical instruments of that period. It describes tanbur, nay, rubab, chang, law and other musical instruments in a consistent and detailed manner. Pharoah considered the stringed, mizrobli lyutnya to be the most common instrument at that time. Lyutnya is affected by a specific mizrob (click), and on the handle are ligatures (lado). In the IX-X centuries lyutnya was called ud in Arabic. This instrument is still preserved in many Eastern countries, among the peoples of the Caucasus. Samples of modern oud are available in the experimental laboratory of the Tashkent State Conservatory.In The Great Book of Music, Farobi describes another instrument, the tanbur. According to the scientist, the tanbur is one of the closest types of instruments to the oud (Trigulova:2008,p.23).

In the tanbur, the strings are pressed using a nail (a special metal click-nail). The tanbur is as common and popular as the oud. The tanbur had two or three brass strings. Two types are known: Khorasan and Baghdad tanburs. The status of the Baghdad tanburs was less (five), and the instrument handle was shorter. The Khurasan tanbur had many statuses, with curtains on the handle from the throat of the instrument to half of the handle. This type of tanbur has not lost its form to this day and is used in solo and ensemble music.Farobi also describes nay. He puts different wind instruments into the piano group according to the principle of sound formation.One of them is a simple reed or a multi-hole reed located in one direction. This type of flute, or flute of various names, still exists today among the peoples of the East. The Vietnamese call it sao, the Tajiks tutek, the Tatars kaval, the Kazakhs sibizga, the Azerbaijanis ney (very rare), the Kyrgyz uoo, choor (shepherd's instrument), and the Uzbeks nay. The scholar also dwells on the common trumpet, which is often made of mulberry wood.

Farobi also mentions dunay (mizmar). The Danube is similar to the modern neighboring or Turkmen folk instrument gosha-dili tyuy duke (an instrument made of double reed tubes).Farobi's treatise also describes in detail the rubab that existed during his lifetime. The rubab of that period, like the modern Kashgar rubab, consisted of a resonator and a much longer handle. There were two types of twisted wire rubab. 1 wooden decal and the main part is made of wood, 2 the lower part is made of leather (Gruber:1953,p.21).

Farobi testifies that the dust belongs to a series of musical instruments that create a melody through the vibration of open strings. There were 15 strings of dust at that time, which were diatonic tuned and had a volume equal to two octaves. All the instruments described in the pamphlet were used to accompany singing, dancing, soloism, and ensemble performance. Farobi testified that the oud played a leading role in the ensemble's performance. In the Book of Musical Instruments, the scholar explains how to tune instruments such as the tanbur, rubab, and chang to fit a melody or a solo singer. Thus, the great scholar of the East laid the foundations of the field of instrumental studies, which studied instruments as a branch of musicology. This field was later enriched and developed in the works of other scholars as well.

According to the period in which he lived, the great scholar Ibn Sina was very close to Farabi. His major treatise, The Book of Medicine, contains a treatise on music, describing his scientific and philosophical knowledge of the music of that period. In these pamphlets a lot of space is given to the definition of instruments. Ibn Sina divides the music of his time into two groups: mizrobli, nohunli (barbad, tanbur, rubob) and open-stringed instruments (shahruh, chiltor, lyre, chang, harp) drawn along the entire resonator cover.At that time, the famous thinker of the East, Sayfiuddin Urmavi, developed a system of musicology. He was known as a master musician, singer and master composer. Based on his experiments in Udda, the scientist stated his theoretical rules. In Urmavi's Book of Piety, the oud is said to be the most popular and modern of musical instruments. Ud had five pairs of strings and 7 status (ladi) in the order of a quarter. The strings are called bam, masnas, masna, zir and the highest hadd. The improved double-stringed oud has retained its structure in recent times. Shirazi (1236-1311), Jami (15th century), al-Husseini, Maraghi, and Ibn Sina also wrote about the five twin strings and the seven maqams (ladas) of Ud, which were tuned to the quartet. A complete sketch of the oud handle given in Jami's "Booklet on Music" gives a complete picture of how to tune it. According to the scientist, the existing 12 maqoms are the basis of ancient mature music. Focusing on the impact of community music on listeners, he believes that it has a deep spiritual and spiritual significance (Musical aesthetics of the Western European Middle Ages and the Renaissanc:1965,p.38).

The pamphlets created in the XIII-XVII centuries contain descriptions of stringed instruments such as chang, kanun, nuzkha, rubob, tanbur, as well as the tambourine.Darvish Ali's (17th century) treatise on music, created in Bukhara, can serve as a source of information about traditional instruments. It contains rare information about the culture of music, in particular, the instruments that exist in the major cities of Central Asia, as well as talented performers.

Darvish Ali's treatise is a valuable source for studying Central Asian music of the 16th-17th centuries. The play tells the creative biographies of famous singers, musicians and composers.

Darwish Ali, like his predecessors, called the udni, which is considered the best in terms of vibrational tone among stringed mizrob instruments, the "king" of instruments. According to the pamphlet, it is dedicated to Zuhra, the patron saint of dust instruments.

The powder described had twenty-six strings and seven curtains for the performance of the seven statuses. In addition, the pamphlet mentions such instruments as law, rubab, kobiz, gijjak, music, ekbon-nay, (damli, leather), ruhavza (six-stringed nohunli), which is widespread in China.Seven of the instruments described by Darwish Ali, tanbur, chang, kanun, ud, rubab, kobiz, and gijjak, were common at that time.Darwish Ali's data confirms the idea that in the practice of music, the ensemble originally used stringed and stringed instruments that produced the appropriate calories. The pamphlet mentions the names of the dustman Dilorom, the flute players Abduqadir and Hodja Abdullah, Mawlana Qasimi-Rabbani, Sultan-Ahmadi – "crazy" rubabists, brothers Sheikh Abu - Bakri Rabbani and Sheikh Behduchi, wise jurist Sheikh Shamsi Rabbani and many other famous masters.

The testimony of Darvish Ali is also valuable in that a large part of the instruments he recorded (flute, trumpet, dust, law, rubab, tanbur, gijjak, kobiz, doira, drum, oud) were used in modern Uzbekistan, Tajikistan and other Central Asian republics, as well as in Azerbaijan. has survived to our day and is improving. These musical instruments have long been firmly rooted in the cultural life of the Uzbek people and have been widely used in its cultural life. Therefore, it is appropriate to call these instruments Uzbek folk instruments. In the works of Abdul Fazl Boyhaqi (XIV century) the names of stringed mizrobli (rud, barbad, tanbur), tambourine and percussion instruments (trumpet, litavra and drum) are mentioned.

It is known that in the literature of the East in the past the system of response to the works of poets ("nazira") was widely used. Many "Khamsa" were created in the same way. In his epic

Sab'ai Sayyar (one of the epics of Hamsa), Navoi reinterpreted the ancient legend of Bahrom Gor. The protagonist of the work is a duster named Dilorom. The poet embodied his instrument as a symbol of music.

According to Zahriddin Muhammad Babur (1483-1530), Alisher Navoi in his time helped many oud players to show their talents. The "Boburnoma" mentions the names of performers of Uzbek folk instruments. Babur also mentions such talented performers as Shah Kulmi-Gijjaki, Hussein Udi, Khoja Abdullah Marvarid Qanuni.

During the Navoi period, the performance of nay, ud, gijjak, kanun, karnay, surnay, drums, doira, chang was widespread. All of them were used both in ensemble performance and solo performance. Dust stood out as a solo instrument.

Comparing the data of the written monuments of the XV-XVII centuries, it can be concluded that by this time, the culture of performance on folk instruments in Central Asia had matured. Performers of Uzbek folk instruments also created their own musical works. At that time, there were talented dust, ud, gijjak, law, nay, tanbur, bulaman performers and mature singers, who formed their own ensembles. Solo performance is also developed.

In his "memoirs", Wasifi mentions the name of Haji Abdullah Marvarid, a lawmaker who invented a great style like a trellis. The melodies and songs he composed were popular among the people. Thus, in the fine arts and literary heritage of the XIV-XVII centuries there was a rich material confirming the stability of the main types of musical instruments, which have their roots in the distant past.

The treatises of Central Asian scholars on music, fiction, and painting allow to some extent to restore some of the broken links in the long chain of historical development of Uzbek folk instruments that have survived to our day. Hundreds of years have passed, and musical instruments have taken their place in solo, ensemble and orchestral performance and are still alive today.

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PERSONALITY-ORIENTED EDUCATIONAL TECHNOLOGY AS A FACTOR IN ACHIEVING EDUCATIONAL EFFECTIVENESS

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ABSTRACT

The article notes that the educational process in modern conditions, with all its possibilities, should be aimed at the development, socialization of the individual and the upbringing of skills of independent, critical, creative thinking, the use of innovative educational technologies in order to increase the motivation of students, improve the quality and effectiveness of training, consistent, continuous, purposeful, systematic assimilation of information, necessary for the organization of life and professional activity of students based on the experience of developed foreign countries, conducting scientific research to achieve their formation by educated, personality-oriented educational technologies are aimed at the development of personality, personality characteristics, abilities of the student taking into account his strategy of thinking and actions, fostering interaction between the teacher and the student on the basis of cooperation and freedom of choice, ensuring the recognition of the student as a value, increasing the motivation of students in the educational process., in order to improve the quality and efficiency of teaching, the use of a number of educational technologies that have an innovative nature and are necessary for consistent, purposeful, systematic mastering of lessons, students are treated with such issues as creative search, conducting small studies, putting forward certain hypotheses, substantiating results, reaching certain conclusions, focusing on the formation of skills and abilities.

KEYWORDS: *Technology, Creativity, Purpose, Innovation, Interest, Use, Motivation, Quality, Student, Education, System, Process, Result, Form, Method, Development.*

INTRODUCTION

Further development of the educational system, introduction of the credit-module system, coordination of educational processes on the basis of innovative approach, development of students' educational-cognitive competency plays an important role. Today, in the education system, the activation of educational and cognitive activities of students in the preparation of

future teachers, the organization of Independent Education is an important factor for the acquisition of modern professional knowledge. A number of researchers are dealing with the issues of increasing the intellektual activity of educators, the evaluation of their preparations. The results of the studies reveal the need for independent education through the development of effective methods of organizing and managing educational and cognitive activities in institutions of higher learning, the formation of individual educational training of students. In this regard, it is important to develop the educational-cognitive competencetirishga to develop the technology of effective organization and conduct of independent work of students through the application of educational technologies aimed at improving the educational-cognitive competence of students, improvement of existing technologies, development of adaptive options for controlling independent education in the field of educational-cognitive activity of students.

Determination of didactic aspects of the formation of methodological culture as an important structural basis of professional training of students in the educational process, improvement of pedagogy of development of methodological knowledge in the style of the basis of innovative activity, finding content of flexibility and mobility in rapidly changing socio-economic, cultural conditions in students, improvement of didactic bases of use of, on the basis of international assessment programs, the development of organizational and pedagogical measures to improve the quality of education is an important priority[1]. Among these tasks, the education of young people with a high spiritual vision and the realization of their potential are one of the pressing issues of today and the priority in their solution is the development of educational-cognitive competence of students in the spheres of professional education. In this regard, regular acquaintance with effective pedagogical technologies, methods and forms of implementation is recognized as an urgent problem.

MAIN PART

It is desirable to use educational technologies of innovative nature in order to motivate students, improve the quality of teaching and improve their effectiveness[2]. The same situation was observed in the experience of developed foreign countries and scientific research was carried out in order to prevent it, to ensure consistent, continuous, targeted, systematic mastering of the necessary information for the organization of vital and professional activities in education recipients, to achieve their formation as educated. As a result of these studies, a number of educational technologies have been created and they are generally referred to as “personality-oriented educational technologies”.

Personality-oriented educational technologies are educational technologies that are aimed at developing the personality, specific characteristics, abilities of the student, taking into account the thinking and action strategy, and their specific aspect is to create a comfortable, necessary environment for the comprehensive development of the personality of the educational recipient[3].

Problematic from personality-oriented educational technologies, educational technologies such as project, collaboration, interactive serve to bring about the faulting of student-learning activities[4].

The following can be recognized as effective educational technology in ensuring the attainment of students' learning and cognition activities today:

1. Problematic educational technologies.

2. Interactive educational technologies.

3. Collaboration education technologies.

4. Project Education Technology archives-project topics.

At the same time, the importance of the educational activities organized on the application of these technologies of education in the field of student's educational and cognitive activity is great.

Today, based on the experience of world education, there is a wide range of use of the following types of personality-oriented educational technologies in educational institutions[5].

Problematic education is an advanced pedagogical technology that reflects the essence of modern education. Its use in educational practice serves to form such skills and skills as creative research in educators, the implementation of small studies, the promotion of certain hypotheses, the justification of results and the conclusion of certain conclusions. In problem teaching, the method of solving problem situations is actively used. In solving problematic situations, controversy is used. It is effective to work in such a phase, especially in small groups.

Interactive learning technology. Today, the use of interactive educational technology is becoming increasingly popular. This educational technology is organized on the basis of cooperation between the main participants of the educational process – the teacher, the student and the group of students, heated discussions, the possibility of mutual exchange of views, free thinking in them, a double statement of their personal views, joint solutions in problematic situations, mutual proximity of students in mastering educational materials," teacher-student – the group of students is characterized by" mutual respect, understanding and support for each other, being in a sincere relationship, achieving spiritual unity, etc.

Collaboration education technology. This educational technology consists in the joint development of educators and students in the process of their educational activities, their understanding of each other, their sense of closeness to each other, their stages of activity and the analysis of the results achieved in them jointly, is of particular importance with the reflection of progressive, developing ideas in themselves.

The main directions of the technology of cooperation education are: the organization of relations based on educational cooperation, denying pedagogical demand; individual approach to students, students on the basis of ideas of humanism; achieving the decision-making of professional and spiritual unity in the educational process[6].

The main directions of the technology of cooperation education are: the organization of relations based on educational cooperation, denying pedagogical demand; individual approach to students, students on the basis of ideas of humanism; achieving the decision-making of professional and spiritual unity in the educational process[7].

Project educational technology archives-project topics The project is a concrete plan, a product of effort aimed at developing the content of pedagogical activity, guaranteeing its outcome on the basis of the goal.

The project is represented in the form of a program, a model, a technological map.

The basis of the project is an idea of a scientific or creative nature.

Designing is a practical effort aimed at developing the content of an activity or process through forecasting, forecasting, planning the expected result based on initial data[8].

The design is based on the system" idea – goal – expected result – prediction – prediction – planning"[9]. Design is carried out with the help of various tools, namely material objects, weapons, for example: computer technology, vatmon or ordinary work paper, ruler, pencil, marker, copy apparati printer, etc.

Pedagogue for the creation of the project:

- Create a project;

- Step-by-step lighting of the process;

- Clearly set the goal;

- To identify objectives;

- Formation of the content of educational material;

- To develop a system of questions and answers;

- Justification of the methodological structure of the process or event;

- It is necessary that the student has the skills and qualifications such as the diagnosis of the level of knowledge and the assessment of the level of his her upbringing.

The design of the educational process – the development of its project (scheme), taking into account all omillarni for the effective organization of the learning process obtained separately[10].

Legislation on the design of the educational process:

1) the effectiveness of the design of the educational process is ensured by the purposeful coverage of all components (technological process, technological process management, tool, information, socio-economic provision)in the project;

2) technological means of education are selected depending on the individual characteristics of the students;

3) design strategies are selected according to the individual style of the teacher;

4) the quality of design depends on the scale of feedback (between the teacher and the student), the content of the design, as well as on the effectiveness of all factors.

In the design of educational processes, it is considered appropriate to pay attention to the content of education, the purpose of education, the correct definition of the expected result, the correct selection of educational methods, forms and tools, the exact criteria for assessing the knowledge, skills and qualifications of students in advance, their proper implementation and harmonization with each other in the allotted time.

One of the important requirements for the organization of modern education is to achieve high results in a short period of time, without excessive mental and physical exertion. The delivery of certain theoretical knowledge to students for a short period of time, the formation of skills and skills in certain activities, as well as the control over the activities of students, the assessment of the level of knowledge, skills and qualifications acquired by them requires a high pedagogical skill from the teacher, a new approach to the educational process.

RESULTS AND DISCUSSIONS

In modern conditions, special attention is paid to the effective use of opportunities for the full realization of individual opportunities of education, increasing its interest, needs, development of abilities[11].

Problematic educational technology is considered to be an improved technology, and today it is used more effectively in higher educational institutions. Its task is to motivate the process of active cognition and formulate a research method in thinking. Problematic education corresponds to the goals of the upbringing of a creative active person[12].

According to its essence and didactic capabilities, problematic educational technology is aimed at the formation of skills and skills, such as creative research in students, the implementation of

small studies, the promotion of certain hypotheses, the justification of results, the conclusion of certain conclusions.

There are the following types of problematic education[13]:

1. Problematic statement of knowledge (problematic lecture).

2. Solve problematic tasks (problematic practical training).

3. Conducting small scientific research (problematic experience).

All the types of problem character are defined in the organization of educational activities of students:

- Individual;

- In pairs;

- Create opportunities for them to work in a small group.

In the course of the training, students will be able to fully understand the essence of the problem theoretically, collect data, sort them out, promote several options for the solution, find the optimal solution, describe the solution, organize actions such as dalillash their own opinion. It is ensured that the student (in an individual case) or students (in pairs and group)will be able to react to the solutions by the expert groups formed by the teacher or students who have deeply mastered the topics.

Necessary conditions are created for students to work with problems of didactic, practical and scientific character in the course of training and in conditions outside the audience[14].

Interactive education technology is considered to be educational technology, which is recognized as the most optimal way to increase the effectiveness of Education. Interfaality represents the ability of participants in the educational process to develop knowledge, skills, skills and the ability to organize a joint, collaborative action to master certain moral qualities[15]. Interactive educational technology is based on the organization of the interaction of students on the way of mastering knowledge, skills, qualifications and certain moral qualities.

Interfaithality in the educational process means that students have the ability to organize a joint, collaborative action through the acquisition of knowledge, skills, qualifications and certain moral qualities. And from a logical point of view, interphalicism, first of all, expresses the conduct of social subjects in conversation (dialogue), an action, an activity based on mutual cooperation[16].

Interactive education is organized on the basis of cooperation between the main participants of the teaching process - teachers, students and groups of students, lively discussions, the opportunity to exchange ideas, to think freely, to express personal views without hesitation, to seek solutions to problems; in mastering is characterized by the formation of mutual intimacy of students, mutual respect, understanding and support of each other, a sincere relationship.

In interactive education, the conversation is organized between the following persons:

1. Student-student (work in pairs).
2. Student-a group of students (work in a group or small group).
3. Student-student team (class, work in a group team).
4. Student-information and communication technologies.

In the essence of interactive educational technology, the organization of the conversation in the form of “student – information and communication technologies” means the acquisition of

knowledge, skills, skills by students independently or under the guidance of the teacher with the help of information technology.

With the help of interactive educational technology, the teacher is able to form such qualities as the development of students' abilities, independence, self-control, self-management, conducting effective conversations, working with peers, listening and understanding their thoughts, independent, creative, critical thinking, promotion of alternative proposals, freely expressing their thoughts, protecting their point of view, striving to find a solution to the problem, getting out of Most importantly, through the use of interactive educational technologies, the teacher acquires the opportunity to objectively assess the students' actions based on interaction through organization, orientation, management, control and analysis in order to achieve a specific educational goal.

In the process of applying interactive learning technologies, students will have the following opportunities:

- Work in collaboration with a group or team;

- Freely express their ideas among peers, demonstrate their knowledge without any mental barriers;

- Creative approach to problem solving;

- Achieve spiritual intimacy with group or teammates;

- Ability to fully demonstrate their internal capabilities and abilities;

- Thinking, summarizing thoughts, sorting the most important ones;

- Self-control and independent assessment;

- Make sure of your own options and strength;

- Mastering the skills of moving in different situations and getting out of difficult situations.

Interactive education technology has the following capacities:

- Around interest in mastering knowledge in students;

- Entourage each participant of the educational processstiradi;

- Has a positive effect on the psyche of each student;

- Creates favorite conditions for through mastering of the educational material;

- Has a multifaceted impact on students;

- Awakens the students' opinion and attitude on the topics;

- Develop vital skills and skills in student;

- Ensures that students' behavior is changed to the positive side.

Interactive learning technology is used in the following forms:

I. Complete the creative task.

II. Solve problematic situations.

III. Social project.

Cooperation education manifests itself in certain signs. Partridge :

- Paying attention to the personality, individuality of the student;

- To master the ready knowledge and deny their re-development;

- Development of independent and critical thinking in students;

- To ensure the emergence of a positive attitude towards the educator and peers;

- Development of cultural communication skills in students;

- Create an environment based on cooperation and mutual equality.

During the use of this technology, students were able to perform the following types of teaching assignments in pairs, in small and large groups:

1. Preparation of educational projects.

2. Create a presentation.

3. Creative worklanm preparation.

The involvement of students in the preparation of educational, scientific and creative projects in the educational and cognitive activities can also guarantee expected effective results. Working with projects takes a special place in the higher education system, creating an opportunity for the student to acquire knowledge that traditional methods of teaching can not provide.

Effective project:

- have practical value;

- provide students with the opportunity to conduct independent research;

- it is necessary that he, like the work process itself, should not be able to guess from the very beginning both when working with it and when completing it;

- it should be able to provide the manifestation of sawdust in solving a wide range of tasks;

- must be able to establish cooperation between students.

There are also factors that negatively affect the effectiveness of projects. In this place, the following factors are indicated:

1. Personality factor: lack of warm attitude of the educator to the preparation of projects; the origin of conflicts due to age differences in the process of communication between the educator and the student; different approach to work.

2. Professional factor: the fact that educators do not have the necessary level of knowledge on the problem under study.

3. Organizational factor: the combination of a large number of students to the project managers; the focus of a large number of time on the solution of organizational issues; the “single allocation” of the student in the educational process (self-exclusion); the inadequate provision of the training process with technical, technological equipment.

Projects prepared by students can be divided into two types. Partridge:

1) projects aimed at solving a specific problem and having a practical nature;

2) projects that direct students to learn some kind of material, to perform exercises designed to achieve some kind of goal.

In the preparation of projects, students must be fully armed with methodical instructions. Arming students with methodological guidelines in the direction of project preparation ensures that such work has a qualitative, practical value. It is not profitable to give the following methodical instructions to students:

- Project essence coverage;

- Explain the requirements for working on the project;

- Familiarization with job evaluation criteria;

- To provide information about the teachers who lead the project (their work experience, academic orientation, base information);

-To show forms of work on the project (work directly, work in the laboratory, carry out research in the library, study, design and compile-build (design) - related projects).

CONCLUSION

The use of innovative educational technologies in order to enhance students' educational and cognitive activities, improve the quality and effectiveness of teaching is considered necessary. Problematic education, interactive education, collaborative education, project education technologies serve to enhance students' learning and cognition activities. Therefore, it is emphasized the need for active use of them. In recent years, step-by-step, but consistently developing personality-oriented educational technologies directly serve the purposes of improving the quality of education, increasing efficiency, providing highly qualified, mentally stable, competitive professionals. In essence, problematic, interactive, collaborative, project technologies serve to prevent the same, tedious process of teaching in the educational system, on the contrary, to create the necessary conditions for it to be interesting, active, vibrant.

Different types of activities, social relations, as well as various subject-practical actions in the learning process take place in the life stages of a person's life. However, only cognition in the learning process will give a person a specific description of learning activities. Learning-based understanding takes a specific form in an individual's learning activities, such as experimenting, building, designing, and performing subject-practical actions in solving research problems.

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A REVIEW ON PLANT BREEDING TECHNIQUES AND CULTIVARS ARE PATENTABLE

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ABSTRACT

Most nations recognize the creation of new plant varieties as a kind of intellectual property right (IPR) stemming from the International Convention on the Prevention of New Varieties of Plants. Article 27.3(b) of the WTO Agreements on Tariffs and Trade of Intellectual Property Rights requires its members of the World Trade Organization (WTO) to "provide for the plants varieties by either patents or by an appropriate generis system, or by any combination thereof." The connection between patenting as well as plant variation rights protection is examined in depth in this article, which examines the recent decision by the European Patent Office's Extended Board of Appeal that techniques for growing broccoli and tomatoes were not patentable. It comes to the conclusion that the right to patent agricultural inventions is becoming more politicized.

KEYWORDS:*Intellectual Property, Patents, Plant Breeding, Plant Variety Rights Protection.*

1. INTRODUCTION

Plant variety protection: Under the International Convention for the Protection of New Varieties of Plants, the development of new plant varieties is protected as a type of intellectual property right (IPR) in most countries (UPOV). Article 27.3(b) of the WTO Agreements on Trade - Related of Intellectual Property Rights (TRIPS) requires members of the World Trade Organization to "provide for the protection of plant varieties whether by patents or from an effective sui generis system, or by any combination thereof." Although the TRIPS Agreement does not specify which "sui generis system" will meet the agreement's requirements, most of the WTO's 153 members have passed domestic legislation depending on the 1991 version of UPOV[1].

Plant varieties that are distinct, homogeneous, as well as stable can be protected under UPOV. If a variety has not been commercialized in the country of preservation for more than a year, it is considered new. A variety is distinct if one or more important botanical characteristics distinguish it from all other known varieties. Plant characteristics within a variety are uniform if they are consistent from plant to plant. If the plant characteristics are genetically fixed and thus

remain the same from generation to generation, or after a cycle of reproduction in the case of hybrid varieties, the variety is stable. Breeders have the right to use protected varieties to create new varieties, according to the 1991 version of UPOV. This exception, on the other hand, is limited to new varieties that are not "essentially obtained" from guarded varieties. This limitation was added by the drafters to protect second-generation breeders from claiming protection for a different flavor by making only cosmetic changes to existing varieties. The limitation of farmers' privilege to save seed for propagating the commodity of the harvest they acquired by planting a protected variety "on their own holdings," within reasonable limits and subject to the protecting of the breeder's legitimate rights," is probably the most contentious aspect of the 1991 Act from the perspective of farmers. Earlier versions of UPOV allowed farmers to sell or exchange seeds for propagation with other farmers[2].

Seed-saving privileges and the ability to develop non-essential new varieties from protected work were built into the legislation as compromises to address public policy concerns. It was recognized that allowing individuals to privatize food varieties could jeopardize food security by locking up breeding material and preventing farmers from saving seed for future harvests. Plant breeders, on the other hand, found any derivation of new varieties from existing protected varieties unpleasant, whether necessary or non-essential, and any seed-saving by farmers robbed them of fresh sales. As a result, they turned to patent law to protect their new varieties, which does not include these exceptions[3].

1.1.Plant Varieties Are Patentable In The United States.

Biological material, including plant varieties, has never been excluded from the scope of patentable subject matter in the United States. Plant varieties in the United States may be protected via a system of plant patents, utility patents, or the Plant Variety Protection Act (PVPA). The Plant Patent Act (see note 3) grants patent protection to new asexually reproduced plant varieties. A plant variety must be novel and distinct, and its invention, discovery, or reproduction must not be obvious under this scheme. One of the scheme's drawbacks is that each application can only make one claim, which must cover the plant variety. In Pioneer Hi-Bred International Inc. v. J.E.M. Ag Supply Inc. the Federal District court, Court of Appeal fixed any possible conflict between patent protection as well as protection under the Plant Variety Protection Act (PVPA). Pioneer's patents covered the manufacture, use, sale, as well as offer for sale of the company's inbred as well as hybrid corn yield product lines, as well as certificates of protection for the same cotyledons varieties of corn underneath the Protection of Plant varieties Act. The defendants claimed that the Plant Variety Protection Act had excluded seed-produced plants from the Patents Act's domain of patentable subject matter. The Federal Circuit dismissed this argument, citing the Supreme Court's decision that "when two statutes are capable of coexistence, it is the duty of the courts to regard each as effective[4].

1.2.Patenting's Impact On Plant Variety Right Protection:

Given the interrelationship among patents as well as plant variety protection, it's possible that a plant breeder could infringe on a patent while developing a new variety. In order to address this issue, Article 12 of the EU Directive on the Protection of Biotechnological Inventions mandates compulsory cross-licensing in instances when a breeder cannot obtain or use a plant variation right without infringement on a previous patent. In such cases, the breeders may seek for a non-exclusive compulsory license to use the invention, which will be granted "subject to payment of an adequate royalty. A compulsory license is also applicable when a patent holder is unable to exploit an invention without infringing on a plant variety right. The Dutch association for seed and young plant breeding, tissue culture, production, and trade has issued a statement on the relationship between patents and plant breeders' rights.

- Patent-protected biological material should be readily accessible for the creation of new kinds, according to the report.
- In accordance with the UPOV Convention's "breeders' exemption," the use and exploitation of these new varieties should be free. (iii) Patent rights shall not be permitted to impede the above-mentioned open availability, use, as well as exploitation in any manner, either directly or indirectly[5].

1.3.Plant Breeding Techniques May Be Patented.

The European patent legislation's exclusion of "essentially biological manufacturing of plants and animals" Directive as comprising "entirely of natural phenomena including such crossing as well as selection" would seem to rule out patent protection for plants breeding methods, but the EPO Enlarged Board of Appeal recently put this theory to the test in two decisions. One question was whether a broccoli crossing and selection method could be patented. Another referral was for a similar kind of innovation using tomato crossing as well as selection[6].

- Is a non-microbiological method for the production of crops that includes the stages of crossing and choosing plants exempt from the exclusion of Article 53(b) EPC simply because it includes a technological feature as a further step or as part of any of the phases of crossing and selection?
- If the answer to question 1 is no, what are the appropriate criteria for differentiating non-microbiological plant production processes that are excluded from patent protection under Article 53(b) EPC from those that are not? Is it particularly important to determine where the claimed invention's core resides and/or if a technological element adds value to the claimed invention above a minor level?

1.4.The Following Is A List Of Technical Requirements For Patentable Inventions:

The EBA's decisions in Broccoli and Tomato highlight the fundamental issue of whether botanical discoveries qualify as patented inventions under patent law. The answer to this issue will vary depending on the current country patent legislation. The United States has the most permissive patent legislation in the world. The Supreme Court had to decide whether a genetically modified bacteria capable of degrading multiple components of crude oil was patentable in Diamond v Chakrabarty in 1980. The patent examiner in that instance had rejected the application on two grounds:

- Microorganism are "product of nature," therefore
- They are not patentable subject matter under US patents act since they are living entities. The Supreme Court dismissed these objections, famously stating that Congress intended for the patent system to "cover everything under the sun that is created by man" as patentable. As a result, the Court determined that the microbe was patentable subject matter.
- The Court did, however, point out that the patent claim at issue ‘was not to a previously undiscovered natural occurrence, but to a non-naturally occurring manufacturing or composition of matter a result of human creativity. To put it another way, it took some human involvement to make a biological invention patentable.

The European Patents System emphasizes the importance of a claimed invention's technical nature. The Convention on the Granting of European Patents' Rule 27 Implementing Regulations defines patentable biotechnological innovations as those that concern[7]:

- Biological material that has been separated from its natural habitat or created via a technological method, even if it has previously existed in nature;
- Plants or animals if the invention's technological feasibility is not limited to a specific plant or animal type;

- A microbiological or other technological procedure, or a product derived from one, other than a plant or animal variety.

In the Broccoli and Tomato instances, the EBA regarded the criterion that innovations had a technical character to be a critical factor in determining whether plant breeding techniques were patentable. The EBA found that, with the creation of new plant varieties for which a special property right was to be introduced underneath the subsequent UPOV Conference in 1960, the parliamentary architects of the EPC were particularly worried with excluding from patentability the kinds of plant breeding processes that were the subject of the EPC's legislative architects' concern. The fact that procedures altering the DNA of plants via technological means such as irradiation were mentioned as instances of patentable technical processes suggested that these were processes to be avoided[8].

The EBA also made reference to the reasons given in the memorandum of the Committee of Experts' Secretariat for agreeing to the partial substitute of the words "purely" biological by the word "essentially" as reflecting the legislative actual intent that the mere use of a technological device in a process of reproduction should never be sufficient to make the process a patentable technology. The EBA ruled that the inclusion of a technical step, whether overt or covert, in a process based on plants sexual crossover and subsequent selection does not exempt the claimed invention from exclusion if that technological step merely helps to execute the breeding process' process stages. It's worth mentioning that the EBA forbids plant breeding methods from being patented. It has been pointed out that plant breeding products are still patentable. Plant breeding claims would have to be deleted, according to an analysis of EPO reporting requirements for recent patent applications, although the plant itself would be patentable. As a consequence, civil society representatives have a "clear legal prohibition on granting patents on animals or plants, breeding techniques, significant biological material, and the food produced." This case shows the political aspect of plant breeders' as well as botanists' work, which was previously thought to be purely technical. Greenpeace, an environmental non-governmental organization, is a cofounder of "No Patents on Seeds" and has been in the forefront of raising public awareness about the issue. Similarly, the NGO ETC Group has been fighting the "patenting of life" for a long time, with Greenpeace protestors destroying a GM wheat crop being grown at a government experimental facility in Australia in July 2011 exemplifying the strength of feelings on the issue. After a Freedom of Information request for further information about the proceedings was denied, the attack occurred. Drought-resistant crops were the goal of the GM trials, which were part of a larger research effort. The concern that large life sciences corporations would jeopardize the independence of small independent farmers and breeders is at the root of the opposition to this study[9], [10].

2. DISCUSSION

The EBA determined that a plant-production process based on the sexual crossing of whole genomes as well as biomass production selection, in which human interference, including the provision of a technical means, provides to enable or assist the achievement of the processing steps, is excluded from patentability as just being essentially biological inside the meaning of the term. As a result, the EBA determined that traditional plant breeding is not patentable. If, on the other hand, a procedure of sexual crossing as well as selection contains a technical step that, by itself, introduces as well as modifies a trait in the genetic code of the plant produced, rather than the introduction as well as modification of that traits being the side effect of the mixing of the genetic makeup of the plant selected for sexual crossing, because that process is l. This principle only applies when the additional step is executed within the steps of sexually crossing as well as selection, regardless of the number of repetitions; otherwise, the exclusion of sexual crossing and selection processes from patentable subject matter could be circumvented simply by adding steps that do not properly directly relate to the crossing as well as selection process, such as upstream

steps trying to deal with sexually crossing and selection, as well as downstream steps dealing with sexual crossing and selection. Per se patent protections was available for the prior or future stages, according to the EBA. This will be the case with plant genetic engineering methods, which vary from traditional breeding techniques in that they operate mainly by inserting and/or modifying one or more genes in a plant.

3. CONCLUSION

It's worth noting that the EBA prohibits the patenting of plant breeding techniques. Plant breeding products, it has been pointed out, are still patentable. According to a study of EPO inspection reports for recent patent applications, claims related to plant breeding would have to be removed, but the plant itself would be patentable. As a result, representatives of civil society have a 'clear legal ban on awarding patents on animals or plants, breeding methods, important biological material, as well as the food produced'. This case highlights the political component of plant breeders' and botanists' work, which had hitherto been regarded as a matter of technical research. Greenpeace, an ecological NGO, is a cofounder of 'No Patents on Seeds,' and has been in the forefront of raising public awareness about the problem. Similarly, the NGO ETC Group has waged a long-running fight against the "patenting of life." The damage of a GM wheat crop being produced at a governmental experimental site in Australia by Greenpeace protesters in July 2011 exemplified the intensity of emotions on this subject. The assault came after a Freedom of Information request for additional information about the proceedings was turned down. The GM experiments were part of a research project aimed at developing drought-resistant crops. The fear of big life sciences companies jeopardizing the freedom of tiny independent farmers and breeders lies at the heart of the resistance to this research. This debate over the patentability of plant biotechnology product, as well as plant breeding techniques, highlights the increasingly political context in which experimental botany takes place. Current research into the effects of climate change on the growth of weeds, insect pests, and crop diseases, as well as methods to design plants to resist salt and aridity, will increasingly be conducted in a political environment.

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A REVIEW OF GUAR GUM PROCESSING, PROPERTIES, AND ITS FOOD APPLICATIONS

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ABSTRACT

Guar gum is a new agrochemical derived from cluster bean endosperm. Guar gum powder is widely used as an ingredient in the culinary, pharmaceutical, paper, textile, explosive, oil well drilling, and cosmetics industries. Guar gum is made from the seeds of the drought-tolerant plant Cyamopsistetragonoloba, which belongs to the Leguminosae family. Indian cluster bean, guar, and guaran are terms for the guar gum flour and galactomannan fraction of guar gum. Guar gum's capacity to create hydrogen bonds with water molecules makes it suitable for industrial usage. As a result, it's mostly utilized as a thickener as well as stabilizer. It also aids in the management of a variety of health issues, including diabetes, bowel motions, heart disease, and colon cancer. The manufacturing, processing, composition, characteristics, food applications, and health advantages of guar gum are discussed in this article.

KEYWORDS:*Cholesterol. Cluster Bean, Dietary Fiber. Guar Gum, Hydration Rate, Viscosity.*

1. INTRODUCTION

The seed of the crop failure plant Cyamopsistetragonoloba, a members of the Leguminosae family, are used to make guar gum. Indian cluster bean, guar gum flour, as well as galactomannan fraction are the popular words used in scientific literature for the bean, guar gum flour, and galactomannan fraction, respectively. Despite the fact that Hymowitz introduced the idea of Tran's domestication, there is no widespread agreement on the beginnings of this plant. This theory described how C. tetragonoloba, the domesticated guar plant, evolved from the drought-tolerant wild Africa species C. senegalensis. Arab merchants brought the latter species from Africa to the South Asian subcontinent as feed for horses somewhere between the 9th as well as 13th century A.D. The domesticated variety is most often linked with Pakistan as well as India, where it has been cultivated for generations as a human and animal food source. In the United States, the guar gum business grew in the 1940s and 1950s. Guar was introduced to the United States prior to World War I mainly as a green manure, but it was not utilized in industrial uses until 1943, which is likely the primary reason for its limited research[1]. The supply of locust bean gum, which was extensively utilized in the paper and textile industries and was imported from Europe and North Africa at the time, had decreased and was difficult to come by.

As a result, researchers at the Institute of Paper Chemistry in Appleton, Wisconsin, and the United States Department of Agriculture set out to discover a native species that might serve as a locust bean gum replacement. Guar gum was reexamined as a result of this search, and it was discovered to be the best answer to the issue. During World War II, the commercial development took place at the University of Arizona. Whistler (1948) of Purdue University studied the gum after the end of the war. He studied the molecular structure and, after studying the characteristics of guaran, a pure polysaccharide, he saw its vast commercial potential and suggested that the guar plant be developed as a domestic crop for industry. Gum is a useful papermaker's adjunct in getting temporary wet strength in sheets, such as paper toweling, and it also aids hydration during the beating of different pulps, according to studies. The services of the United States Department of Agriculture's Soil Conservation Commission were recruited, and as a consequence, many seeds were examined for their potential. The best results were from guar, or Cyamopsistetragonolobus, an annual drought-resistant leguminous plant that grows three to six feet tall and has been used as cow and horse feed in some parts of India for generations. Guar gum is similar to locust bean gum in that it is made up mostly of the complex carbohydrate polymer galactose and mannose, but the amounts of these two sugars are different. Guar flour is said to be useful as a beater addition for increasing the strength of some types of paper. Guar also offers characteristics that may be helpful in warp sizing, printing copied or pasted, and some finishing processes, according to reports. Separating the gum-containing endosperm of the seed from the outer, mostly fibrous parts is required to extract the gum. Guar gum consumption grew quickly, but it was the discovery of anionic and cationic guar gum derivatives, as well as their application in oil and gas well stimulation, that propelled guar gum to its current commercial prominence. Guar gum thickens dye solutions in textile and carpet printing, allowing for more clearly drawn patterns. Guar gum has been used in explosions for over 25 years as a water-blocking addition to dynamite. It's become the main gelling agent in water-based slurry explosives in recent years. The addition of tiny quantities of guar gum to the pulp improves the papermaking process. It acts as a fiber deflocculant as well as a dry strength enhancer[2].

1.1.Production:

Guar gum is a gel-forming galactomannan produced by grinding the endosperm of Cyamopsistetragonolobus, a leguminous plant that has been cultivated for millennia mostly in India and Pakistan, where it is a major crop and has long been utilized as a source of food for people and animals. The guar plant is mostly a sun-loving plant that can withstand high temperatures but is sensitive to cold. A soil temperature of 25–30 °C and, preferably, a dry environment with scarce but frequent rainfall are required for optimum development. Rain is required for optimal development of the guar plant before sowing and again to promote seed maturity (Anderson, 1949). Guar beans of poorer quality are produced when there is too much moisture in the early stages of development and after the seeds have matured. In general, the monsoon rain pattern in northern India and Pakistan offers excellent growth conditions for guar. Guar is cultivated in India and Pakistan for almost 90% of the world's supply. The crop's unique need for the appropriate quantity of rain at the right time of development and maturity renders it highly reliant on yearly rainfall patterns, resulting in periodic significant fluctuations in guar availability and pricing. Guar is also grown in the southern hemisphere, in semi-arid regions such as Brazil, Australia, South Africa, and parts of the United States such as Texas and Arizona. Guar seed output in these nations is projected to be 15,000 MT per year. In Australia, the agro-climatic conditions are also favorable for guar production. The Department of Agriculture and Rural Industrial Development Agency has made efforts to encourage guar production in Australia. Similarly, it is claimed that China and Thailand are attempting to cultivate guar. As a result, India and Pakistan may no longer have a monopoly on guar in the future[3].

1.2.Processing:

The way guar gum is processed differs from one plant to the next. The basic overview of the guar gum production process. Guar seeds are spherical in form, brownish in color, and smaller than pea seeds when separated from their pods. The gum is extracted commercially from seeds mostly via a mechanical process that includes roasting, differential attrition, sifting, and polishing. The germ is removed from the endosperm when the seeds are cracked. Each seed yields two halves of endosperm, which are referred to as underutilized guar split. Refined guar splits are produced when the fine layer of fibrous material that comprises the husk is removed and separated from the endosperm halves by polishing.

1.3.Non-Food Uses Include:

Guar gum demand has risen in recent decades as a result of the creation of various guar gum derivatives, such as anionic and cationic derivatives. Guar gum's current economic significance stems from its usage in oil and gas well stimulation, particularly hydraulic fracturing, which uses high pressure to break rock. Guar gum thickens fracturing fluid, allowing it to transport sand into cracked rock. Due to the presence of sand, this crack stays open, allowing gas or oil to flow to the well bore. The guar derivatives hydroxypropyl guar (HPG) and carboxymethylhydroxypropyl guar (CMG) are used in fracturing fluids (CMHPG). Guar gum thickens dye solutions in textile and carpet printing, allowing for more clearly drawn patterns. Guar gum has been used in explosives for over 25 years as a water-blocking addition to dynamite. It's become the main gelling agent in water-based slurry explosives in recent years. Guar gum's water-blocking, swelling, and gelling properties allow it to be used as an ingredient in the explosives business. Even under damp circumstances, the explosive properties of ammonium nitrate, nitroglycerine, and oil explosives are preserved by combining them with guar gum. The addition of tiny quantities of guar gum to the pulp improves the papermaking process[4].

1.4.Properties Physico-Chemical:

The behavior of guar galactomannan and other polysaccharides in an aqueous media determines their biological characteristics. On dispersion, guar gum swells and/or dissolves in polar solvents, forming strong hydrogen bonds. It only generates weak hydrogen bonds in nonpolar liquids. With decreasing particle size, lowering pH, and rising temperature, the rate of guar gum dissolution and viscosity development usually rises. In the presence of dissolved salts and other water-binding compounds like sucrose, hydration rates are decreased[5].

1.4.1. Rate Of Hydration:

Guar gum's rate of hydrating varies. In practical applications, a 2-hour hydration period is needed to achieve maximal viscosity. The rate of hydration is mainly determined by the particle size of guar gum powder. As a result, extremely fine mesh guar gums are available for fast initial viscosity. However, for maximal hydration and viscosity, a significant time gap is still required.

1.4.2. Activity Of Hydrogen Bonds:

Guar gum's hydrogen - bonded activity is owing to the presence of a hydroxyl group in the molecule. With cellulosic material and hydrated minerals, guar gum forms hydrogen bonds. The electro kinetic characteristics of any system are significantly altered by the addition of guar gum. When hydroxyl groups in guar gum are replaced with hydroxypropyl groups, steric hindrance occurs, lowering hydrogen bond stability. Viscosity and hydration rate are affected by a variety of factors. Guar gum's viscosity and hydration rate do not stay constant with changes in temperature, pH, solute, concentration, and other factors.

1.4.3. Temperature:

The most important element affecting the rate of hydration as well as maximum viscosity is temperature. When guar solutions are produced at higher temperatures, they achieve maximum

viscosity considerably quicker than when they are made at lower temperatures. However, prolonged heat is thought to have a degradative impact. In most instances, heated guar gum solutions have a lower ultimate viscosity than cold water guar gum solutions that have been allowed to hydrate slowly. For maximal viscosities of guar gum dispersion, a temperature range of 25–40 °C is recommended. At 25 degrees Celsius, the viscosity of a 0.5 percent (w/w) guar solution is considerably greater than at 37 degrees Celsius[6].

1.4.4. pH:

Guar gum solutions are stable at pH levels ranging from 1.0 to 10.5. This is owing to the fact that it is non-ionic and uncharged. The pH has no effect on the final viscosity of guar gum, but it does influence the hydration rate, which varies with the pH. The fastest hydration happens at pH 8–9, while the slowest hydration occurs at pH. Sugar Glucose compete with guar gum molecules for both the available water in a guar-sugar solution, thus the presence of sugar in guar gum solution causes a delay in the hydration of guar gum molecules[7]. Guar-sugar solution viscosity diminishes with time and is inversely proportional to sugar content. Sweeteners including aspartame, acesulfame-k, cyclamate, and neotame have little effect on guar gum solutions' inherent viscosity. Other than water, salt is the most frequently used component in meals, and its impact on guar gum has been extensively studied. Guar gum solutions in brine behave similarly to guar gum solutions in water. Salt has little effect on the rate of hydration; nevertheless, sodium chloride marginally improves the ultimate viscosity of completely hydrated guar gum. When a physiological buffer, such as Krebs bicarbonate, is added to a 0.25 percent guar gum solution, the viscosity is reduced compared to gur gum in water alone. The hydration of guar gum solution is hampered by salts. With the addition of salts, the viscosity of a 0.5 percent guar gum solution rises[8].

1.5.Applications In The Food Industry:

Guar gum is a new food additive used in different food items for food stability and as a fiber source in the food business. It is popular among both manufacturers and consumers since it is a cost-effective and natural addition. It is utilized as an addition in a number of meals because it alters the behavior of water, which is a frequent component in many foods. Table 3 lists some of the most frequent guar gum culinary uses. Title 21 CFR 184.1339 covers permissible usage levels and limits in different goods, confirming guar's "generally recognized as safe" (GRAS) classification[9].

1.6.Advantages To Your Health:

Animal experiments have been performed to see whether guar gum has any detrimental or positive effects. Clostridium butyricum fully degrades guar in the large intestine. Only when the guar gum is administered to the animals at a high concentration of approximately 10–15 percent on a weight basis does it cause harm. Because of the reduced feed intake and poor digestion caused by the high dosage, the animal's development would be stunted. The main reason of the negative effects is thought to be the increased viscosity of the contents of the digestive system as a consequence of guar gum consumption at greater concentrations[10].

2. DISCUSSION

The seeds of the drought-tolerant plant Cyamopsistetragonoloba, a member of the Leguminosae family, are used to make guar gum. Indian cluster bean, guar gum flour, and galactomannan fraction are the common names used in scientific literature for the bean, guar gum flour, and galactomannan fraction, respectively. Guar gum is a new agrochemical derived from cluster bean endosperm. Guar gum powder is widely used as an ingredient in the culinary, pharmaceutical, paper, textile, explosive, oil well drilling, and cosmetics industries. Guar gum's capacity to create hydrogen bonds with water molecules makes it suitable for industrial usage. Guar gum aqueous

solutions have a high viscosity. Its characteristics allow it to be used in a variety of sectors, including food, pharmaceuticals, textiles, oil, paint, paper, explosives, and cosmetics. Its cheap cost is another reason for its appeal in the business. It is used in the gums and stabilizers sector because to its low cost. It has a broad range of uses in the culinary sector, including ice cream, sauces, drinks, pastry, and meat. It is also utilized as a dietary fiber supplement in food items. Its intake lowers the risk of heart disease by lowering cholesterol levels in the body, controlling diabetes, and maintaining human bowel movements.

3. CONCLUSION

Guar gum is produced from the seed endosperm of the guar plant, Cyamopsistetragonolobus, which has been grown in India and Pakistan since ancient times. Guar gum is a good substance to look at. It has a high propensity to create hydrogen bonds in water, making it a new thickener and stabilizer. Guar gum aqueous solutions have a high viscosity. Its characteristics allow it to be used in a variety of sectors, including food, pharmaceuticals, textiles, oil, paint, paper, explosives, and cosmetics. Its cheap cost is another reason for its appeal in the business. It is used in the gums and stabilizers sector because to its low cost. It has a broad range of uses in the culinary sector, including ice cream, sauces, drinks, pastry, and meat. It is also utilized as a dietary fiber supplement in food items. Its intake lowers the risk of heart disease by lowering cholesterol levels in the body, controlling diabetes, and maintaining human bowel movements.

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IMPACT OF THE BLOCK CHAIN ON DIFFERENT TOOLS AND APPLICATIONS: A REVIEW

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ABSTRACT

Block chain technologies have attracted a lot of attention from both the corporate sector and academia because to its decentralized, persistent, privacy, and auditability features. A survey is performed in this survey paper via a search for journal/research papers related to Block chain technology. To conduct this study, datasets were obtained from a variety of academic websites, including Science Direct, ACM Digital Library, and In der Science, to name a few. Following the first round of exclusion, 150 research papers were evaluated for the database survey's final round. The primary aim of this research is to provide academic academics with a comprehensive analysis of Block Chain technology and their many applications. The difficulties of implementing Block chain, as well as the security and privacy concerns that it raises, are also discussed. This study looked into the use of block chain technology in a variety of applications, as well as its implementation problems.

KEYWORDS: *Block Chain, Block Chain Applications, Healthcare, Privacy And Security.*

1. INTRODUCTION

Because of block chain's decentralized, peer-to-peer transaction, and irreversible characteristics, block chain technology has become more popular in recent years. It is a public digital ledger that is available to all network users. SantoshiNakamoto's Bit coin crypto money from 2008 inspired the concept. The market has expanded to include nearly 2000 coins since then. Despite this, Bitcoin is still a niche currency in many parts of the globe. Bitcoin is connected to a number of problems. The transaction confirmation and mining procedure in the Bitcoin system takes approximately 7-8 minutes.

This idea may be applied to a broad variety of industries, including healthcare, IoT, industry, and supply chain monitoring. The study's primary goal was to look at academic implementations of Block chain in a range of applications, as well as some recent developments by different organizations to utilize Block chain technology in various fields. Digital data is sent from one

end to the other in today's world via an unreliable transmission path. Here, privacy and secrecy are major considerations. Block chain technology allows for secure and private peer-to-peer communication[1].

Transactions in block chain technology can be viewed by anybody, but they can't be changed once they've been recorded. Following a comprehensive study of the literature, it was found that block chain is being utilized in a number of useful applications. According to the authors of, block chain is a probabilistic state device that is useless when decision finalities is needed. The authors addressed some of the possible uses of block chain technology, as well as how it might be used to solve a variety of traditional database issues[2].

1.1.Distributed Ledger Technology

Block chain technology is one of the most difficult study fields today, yet it lacks technological details that would enable it to be used in almost any area. The research papers are categorized according to their intended purpose. The difficulties of using block chain technology in different applications were also addressed in this research. The following is the main contribution of this paper:

1.2.Block Chain Communication System

Block chain is a decentralized peer-to-peer communication method. It's also open to the public, much like a digital ledger. It may be used to protect stored data or transactions without the participation of a third party in a trusted environment. Documents from five technical databases are included in the first keyword chain: IEEE Xplore, ScienceDirect, the ACM Digital Library, the Science Website, and Indian Science. There were 751 research articles in the first phase. We reject 526 articles after reading the abstracts. Any articles that were no longer relevant were also removed. We looked at the whole sheet of paper in the second phase and performed some more elimination.

Bitcoin is based on block chain technology. The encrypted ledger is stored on a database that is open to the public. Block chain is a global data-base system that can be accessed from anywhere in the world by anybody with an internet connection. A block chain, unlike conventional databases, is not owned by a single organization, such as a bank or a government. It becomes very difficult to deceive the system using false papers, transactions, or other information when a complete network is working on it. A distributed ledger, often known as a block chain, is a network of nodes that keeps track of data indefinitely. This not only decentralizes but also disseminates information.

A local Block Chain Copy may be updated on a regular basis to keep all of the nodes in the network synchronized. A block chain is a decentralized computing and information dissemination network that allows many nodes to make decisions independently of one another. Single points of failure are a concern with centralized systems. To prevent a single-point failure in a decentralized system, multiple coordinate points are used. In a distributed system, each node works together to complete the task[3].

2. DISCUSSION

Peer-to-peer (P2P) is how block chain operates. Using the, the transaction is verified. Before being added to the system's block chain, it must have a hash task, a digital-signature, as well as public-private keys. The function of hash is used to tamper-proof the blocks in a block chain system. If they use a digital signature to establish their identity, no one can dispute their own activity on the block chain networks. A digital signature is used for signing and transmitting a document together with the transaction by a node. The remaining nodes in the network can check

the signature. The signature is confirmed with the public key after the message is signed with the private key[4].

2.1.Advancements In Block Chains

The block chain system's digital signature prevents non-repudiation. The architecture of block chain can be permissioned or permission less. It varies based on the application's network. One of the challenges of block chain is scalability. The smart contract and computing paradigm in a public block chain were explained by the authorsBlock chain, as a software connector, aids in the explicit expression of critical design concerns on the system's ultimate performance and quality qualities. The study described in offered a unique technique for confirming block transactions with high accuracy[5].

In order to confirm a transaction replacing its original signature, a new interactive incontestable signature (IIS) system between the dealer and the owner is used. By this signature, the dealer may ensure the owner that the transaction is not republished in the Block chain. The system has been proven to be secure in terms of unforgeability for owners and incontestability for dealers. The authors provide a lesson on the Block chain concept and its operation. Without the use of a central authority, Trust Chain may create trusted transactions between strangers. This opens up new areas of Block chain application, with a focus on individual trust.

The notion of Block chain technology was born out of the Bitcoin cryptocurrency, and it has since been used in a variety of fields. The following paragraphs summarise Block chain applications in the financial fields, government, healthcare, IoT, legal, reputation, transport, business, cloud computing, power grid, e-business and supply chain.

2.2.Application of Blockchains:

Healthcare is a field in which patients, doctors, and medication departments must use cutting-edge technology to deliver well services to end customers. Privacy is the main issues concerns that must be addressed in the health-care industry. The features of Block chain show how to deal with the problem that has occurred. Digital data base can be shared amongst several users while protecting privacy using Block chain.

The Block chain is employed in the digital right management system by the licensor, users, and mining. The Block chain provides a decentralised framework for the distribution of digital content. The licensor grants authorization to each d9gital document uploaded via the modern contract. In addition, the user has a smart contract that allows them to access as well as play the digital-document stored in the Block chain database. The usage of Block chain in a digital legal context has previously been explained in certain study. Block chain, according to the authors, may be a solutions for present legal frameworks controlling contracts between countries, allowing for the preservation of a digital record without the need for a third party.

In the egovernment in China, the authors examined the benefits of the use of Block Chain technology such as enhanced quality, service volumes, openness, accessibility and the exchange of information across various organisations. The Block chain is resistant to internet attacks, transactions are public, and once a transaction is put to the Block chain, it cannot be edited or deleted, making data transactions safe, protected, as well as accessible to all. According to the authors, block chain technology may be utilised in governance since it is decentralised, secure, peer to peer, and accessible to all network users.

The power grid businesses include trade in energy, solar systems, intelligent metering [108] and microgrid energy. End users can deliver intelligent services through Block Chain Technology. A block string is a collection of short messages and timeline blocks that are broadcast to all network nodes. All nodes in the network are allowed to sign messages using the public/private

key combination, and are pseudonymized. Before the rest of the network, each node signs a message. On a regular basis, a new message is mined, and the message is then posted to the Block chain[6].

When you add a message to a block, it becomes persistent and irreversible. The authors described a Block chain-based transitive micro-grid concept that can ensure transactional integrity across decentralized computing nodes. PETra's trading workflow was also extended by the authors. PETra is based on distributed ledgers like Block chains and allows for anonymous communication, bidding, and trading. The hybrid Block chain technology, which combines public and private Block chains, adds new capabilities to the power grid.

There are seven levels of ITS. Each layer is linked to a set of hardware or application services that help in the delivery of intelligent services. Device security and data privacy are increased when coupled with Block chain technology. Secure key management is one of the most critical challenges in the heterogeneous network, according to ITS. The physical layer is made up of several physical sensors that are integrated into the vehicle. The data layer is made up of a series of blocks linked together by encryption and hashing algorithms. Block chain-based ITS connects vehicles in a peer-to-peer paradigm at the network layer[7].

In the consensus layer, various types of consensus algorithms are utilized for data validation in order to achieve mutual confidence among peers. Then, according to the consensus algorithm, some incentive is distributed, and the modern contract is completed. Lastly the application layer offers the system with intelligent services and smart management. In their work, the authors developed a methodology for collaborative data collection using public Block chain. The system-specific Block chain was created using the Proof of Work consensus mechanism.

Storage, processing, services, infrastructure, and applications are all provided through cloud computing. In a network, cloud computing has numerous advantages. The authors presented a unique Software Defined Networking (SDN)-based distributed cloud architecture that allows supervisor fog nodes at network's edge to fit the design requirements. The concept suggested is a distributed blockchain cloud architecture, providing low-cost, secure and on-demand access to competitive IoT network computer infrastructure.

The provenance architecture the two articles, ProvChain as well as JointCloud, demonstrated how Block chain features like trust, no-central processing, as well as end-user safety and privacy may be used to solve cloud computing's drawbacks. Users may observe their transactions in the Block chain system in the form of a digital ledger.

In a P2P network, a traditional reputation system has a number of drawbacks, including data updating, accuracy, maintaining a vast file-systems, as well as dynamic network change. The network are prone to attack such as the collusion attack and the Sybil attack. The major issues in the system are overcome via a Block chain-based reputation system. The authors of the study first analyzed present reputation system before presenting the first generalised reputations system based on the Block chain that can be deployed to different networks[8].

The study makes a substantial contribution by setting up a systemic framework to collect information on the identity and reputation of individuals online, so that personal assessments of behaviour are fully conducted. Some of the main contributions are as follows: The suggested method includes a social depdence network identity grouping mechanism as well as an intelligent contract management framework referring to personal online ratings on the basis of the aggregated digital identity, and experimental implementation based on the Block Chain Technology[9].

In recent years, the rapid expansion of internet purchasing has resulted in a massive increase in E-business. Customers are more interested in the E-business model because of trusted data marketplaces. From a research standpoint, just a few studies have been conducted in this application area. The authors illustrate how intelligent and paid IoT data may be transacted utilising the Peer to peer chain and intelligent contracts. Authors can aid small, medium and huge companies by offering block-chain e-commerce solutions[10].

Companies and enterprises can migrate their activities to Syscoin without the requirement for a third party. The distinctive features of Syscoin in an architectural framework enabling the use of integrated mining and minimal inflation are also debated in this article. It also allowed for the adoption of trustless payments and services in commercial settings today. Syscoin token holders will be able to participate in joint venture as well as partnership, & get an investment proposal.

2.3.Authenticity And Privacy:

Different nodes are responsible for different types of data or transactions.

A Chinese government agency has launched a Block chain-based authentication system: The Chinese government's research body devised a Block chain as Service policy for a burgeoning supply-chain. It is solely focused on 2 key goals: to store unchanging data and to track changing to data. This new platforms was created to help countries develop faster by pursuing Block chain technology. Other industries that use Block chain-as-a-service include JD.com, a Chinese e-commerce behemoth, which uses the Block chain platform to track beef imports, and Walmart, which uses Block chain for shipping matters.

Other industries that use Block chain-as-a-service include JD.com, a Chinese e-commerce behemoth, which uses the Block chain platform to track beef imports, and Walmart, which uses Block chain for shipping matters. The application of RFID and Block chain technology in the construction of a traceability system for the food supply chain as well as process validation. Tracking and exchange of authentic Agri-Food data in the manufacturing, processing, storage, distribution and sale of linkages can successively achieve trackability with trustworthy information along the agri-food supply chain.

The authors provided a solution based on the Block supply chain in their study to tackle problems such as dual marginalisation and asymmetry of information. In order to provide an open, transparent, impartial, trustworthy and secure information platform for every member of the supply chain the authors created a food supply chain traceability scheme based on HACCP (Hazard Analysis and Critical Control Points), Block chain, and the Internet of Things[7].

2.4.Challenges Faced Technology By Block Chain

Block chain technology research challenges:-

- How can an efficient Block chain distributed system be designed that allows for system scalability?
- How do you make a mutual choice in a permission-based system while disregarding rogue nodes?
- Mining processes that require less computing power to complete.
- Development of a Block chain application based on smart contracts
- Using the Block chain network to distribute task scheduling.
- As the Block chain grows in size, how can each node efficiently store and validate data?

3. CONCLUSION

Block chain, according to the author, is a peer-to-peer (P2P) decentralized transaction ledger that is accessible to the public. Since 2008, Bitcoin and Block chain have been two of the most

important technologies in the information system. In a number of applications, block chain may be used to conduct transactions in a secure environment without the need of a third party. In this survey study, the architecture and working idea of Block chain are described first, followed by a description of the survey methodology. The examples below show how Block chain technology may be utilized to solve current centralised systems in a decentralized way while also resolving various security issues. Block chain is most often used in the Internet of Things (IoT), healthcare, and other high-demand application areas. Some progress has been achieved in terms of privacy and security concerns, according to the study's results, but much more work remains. Block-chain technology's advantages include decentralization, public visibility, transparency, and security, to name a few. However, there is still more research to be done on the network, scalability, and mining process of the Block chain system.

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ASSESSING THE SOCIAL PROTECTION OF LABOR MIGRANTS IN UZBEKISTAN

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ABSTRACT

The article highlights that globalization and integration processes to further accelerate international labor exchange, and the efforts undertaken for social protection of labor migrants who returned to Uzbekistan during the pandemic. International labor migration is the movement of workers between countries around the world that occurs during organized or spontaneous migration and is influenced by a variety of factors. These are traditionally divided into three factors: economic, demographic, and political, all of which are interconnected. The most significant among them is the economic factor.

KEYWORDS:*United Nations, labor migrants, pandemic, Agency of External Labor, International Organization for Migration, Center for Economic Research and Reforms, "Charity to You", Center for Social and Legal Support of Women and Their Families, poverty reduction.*

1. INTRODUCTION

The root of migratory process dates back to ancient times, when the fundamental division of labor and the separation of livestock and agriculture first emerged.

International labor migration is the movement of workers between countries around the world that occurs during organized or spontaneous migration and is influenced by a variety of factors. These are traditionally divided into three factors: economic, demographic, and political, all of which are interconnected. The most significant among them is the economic factor.

2. MATERIAL AND METHODS

Globalization and integration processes have boosted worldwide labor exchange in recent decades. The number of international labor migrants grew by 11.4 percent between 2015 and 2019, according to the United Nations and the World Economic Forum. Immigrants made up 3.5 percent of the global population in 2019and there was an increase by 25 % compared with 2000[1]. It's worth noting that women account for 48 percent of all migrants [2]. Women's engagement in labor migration is a particularly difficult and contentious process.

The rising scale of migration processes highlights the necessity to enhance the protection of migrants' and their families' interests. It should be emphasized that in this field the Republic of Uzbekistan is enlargingmutually beneficial collaboration with foreign countries and prominent international organizations.The Ministry of Employment and Labor Relations of the Republic of Uzbekistan, in particular, has developed close ties with the labor ministries of Russia, South Korea, Japan, Turkey, the United Arab Emirates, the United States, Azerbaijan, Kazakhstan, and Tajikistan.

Cooperative affairsare being established with UN agencies and international institutions.A Memorandum of Understanding between Uzbekistan and the International Labor Organization was signed on February 28, 2017 in Tashkent. On November 27, 2018, in Geneva, at the 109th session of the Council of the International Organization for Migration, the United Nations Agency for Migration Uzbekistan became the 173rd member of the IOM.

To safeguard the social interests of labor migrants in the Republic of Uzbekistan, the International Organization for Migration's Constitution was ratified on December 12, 2018. The International Organization for Migration's Constitution includes the effective protection of migrants' rights, as well as the gathering, selection, and preparation for migration, language training, giving information to migrants, medical examinations, and other migration services [4].

On August 20, 2019, the Decree of the President of the Republic of Uzbekistan "On measures to further strengthen the guarantees of protection of citizens of the Republic of Uzbekistan and their families engaged in temporary employment abroad" was adopted to protect the social interests of participants in labor migration [5]. In addition to ensuring the protection of the rights and interests of citizens going abroad for temporary work, the document also sets a number of tasks to create decent living and working conditions for migrant workers and their families.

It’s known that due to the pandemic, strict quarantine measures were implemented around the world, interstate transportation was restricted, the number of jobs available to labor migrants in the labor market decreased dramatically, and the number of unemployed rose by 195 million in the second quarter of 2020 due to falling wages [6].

The process of external labor migration of Uzbekistan is primarily transitory and seasonal, according to the Center for Economic Research and Reform, with most migrants working abroad in the spring and summer and coming home in the winter, will be hired in sectors where skills are not required.

More than 2 million Uzbek migrants labor in the Russian Federation, accounting for 83 percent of all Uzbek migrants. Due to the pandemic, 508,688 migrants, including 126,422 women, in 2020 and 9,279 women out of 32,888 migrants returned to Uzbekistan in the first quarter of 2021.

Migrants returning to Uzbekistan are being provided with social protection measures, as well as practical support from governmental and non-governmental non-profit organizations. The Agency of External Laborprovided legal assistance to 5,513 migrant workers, consulting services to 200,893, social aid to 3,883, financial assistance to 2,769, and one-time financial assistance to 1,750 during the five months of 2021.121 labor migrants were housed temporarily in hostels. The bodies of 168 people who died in foreign countries were brought back. 145 people who were in perilous situations abroad were repatriated. The medical expenditures of 17 critically injured labor migrants were compensated, and they were returned. Unpaid wages and compensation were paid to migrant employees in the amount of $ 460,000.

In September-October 2020, in non-governmental organizations such as "Charity to You", the Center for social and legal support of women and their families, the regional branch of the Center for Support of Citizens' Initiatives and "Perspective Generation" helplines were

established on the basis of social partnership with government agencies, and free legal, psychological, medical and social assistance has been provided to migrants and their families seeking to return from abroad in the time of a pandemic. Legal assistance was provided to 65 migrants who suffered from human trafficking during the pandemic for repatriation and recovery of their documents. The Center provided social rehabilitation assistance to 100 migrants in 35 psychological, 30 legal, 20 social and 15 economic issues.

3. RESULTS

The Center's initiative "Comprehensive services to vulnerable sectors of society in Uzbekistan, who were heavily suffered from the SOVID-19 crisis, in order to swiftly restore their health and support them" is noteworthy. The Center's specialists conducted questionnaires as part of the project to study the social situation of migrants returning from abroad during the pandemic, and based on this review, projects were made with the assistance of business consultants to ensure the employment of 12 vulnerable family migrants.The United Nations International Organization for Migration has allocated 321.8 million sums to finance these projects. Migrants and their families returned from abroad have been given free 4 welding shops in Andijan, Izbaskan, Altynkul districts, and 4 baking shops in Karasuv, Andijan, Altynkul and Kurgantepa districts, 3 sewing shops in Pakhtaabad, Asaka and Andijan, equipments for constructing a greenhouse in Andijan district. [10: 5-p].

It's important to mentionthat the epidemic has shifted most migrant workers' intentions. They end up with returningfrom compulsionin most cases, not of their own volition. As a result, their financial position deteriorates, putting them in risk of becoming impoverished.

In Uzbekistan, measures have been created to methodically organize work on poverty reduction. Tasks such as vocational training, financial literacy, entrepreneurship, infrastructure improvement, and the provision of targeted benefits have been indicated as being particularly important.

Today, Uzbekistan plans to work with specialists from international financial organizations, the United Nations Development Program, the World Bank, and the Asian Development Bank to create and execute conceptual documents on poverty reduction. It is planned to develop a poverty reduction strategy and concept in Uzbekistan until 2030, based on advanced foreign experience in poverty reduction, particularly that of China.

4. CONCLUSIONS

Today, China has done a great deal to eliminate poverty. According to the World Bank, China has pulled 850 million people out of poverty to date. In 1981, the poverty rate in China was 88 percent, but it is now 0.7 percent While the poverty rate in China was 88 percent in 1981, it accounted for 0,7 percent in 2019. This number corresponds exactly to the poverty rate in developed countries.

In conclusion, it should mentioned that one of the methods to reduce poverty in the country is to increase international cooperation to defend the social interests of labor migration participants.

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AHMAD YASSAVI AND YUNUS EMRE

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ABSTRACT

The issue of the influence of Khoja Ahmad Yassavi's work "Devoni hikmat" on the creativity of the Turkish people's poet Yunus Emre has been investigated. Khoja Ahmad Yassavi founded Uzbek Sufi literature with his poems called "hikmat". He relied on the experiences of sufi literature in Arabic and Persian [1, 154]. The Turkic peoples were inspired by religious songs of oral creativity. The weight of his wisdom was mastered by folk poetry. Another of the main factors of this phenomenon is the interest of the Turkic peoples in the ideas of Sufism.

KEYWORDS: *Wisdom, Wisdom Tradition, Yassavi Followers, Yassavi Order, "Devoni Hikmat", Turkish Folk Poetry Genres, Yassavipropriety.*

INTRODUCTION

The important role of Khoja Ahmad Yassavi in the history of the spiritual life of the Uzbek people is explained by the fact that it was founded on the first Turkic sect. Yassavi sect soon spread to very wide areas.

Khoja Ahmad Yassavi founded Uzbek sufi literature with his poems called "hikmat". He relied on the experiences of sufi literature in Arabic and Persian [1, 154]. The Turkic peoples were inspired by religious songs of oral creativity. The weight of his wisdom was mastered by folk poetry. Another of the main factors of this phenomenon is the interest of the Turkic peoples in the ideas of Sufism.

Wisdoms came to the field with the aim of promoting more enlightened-mystical ideas, and not artistic skill. His contemporaries yassavi regarded wisdom not as a simple work of art, but as a sacred work that promotes the ideas of the Quran, Hadiths and Sufism.

Therefore, after Khoja Ahmad Yassavi, the tradition of saying wisdom did not disappear, but, on the contrary, continued to appear more powerful.

MAIN PART

Thanks to the wisdom of yassavi and the school of literature, Turkish poets, who worked in huge territories around one literary language.

In the history of the Tatar people and literature, too, Ahmad Yassavi and his caliph Suleyman Bakirgani occupy a special place. The influence of proverbs on the work of tatar folk poets, such

as the narration of Tatar written literature, more precisely the Qul Ali (XIII century), the Qul Sharif (XVI century), the Mavloquli (XVIII century), is clearly felt.

The Turkish scientist Professor Fuad Kupruli emphasized the issue of the emergence of Turkish folk literature in his book "the first thinkers in Turkish literature", which he wrote a century ago, and noted that Turkish folk literature is a continuation of Central Asian Turkish Sufi literature [2, 119].

Turkish scientists Kemal Eraslan, Mustafa Tatchi, Mehmed Sheker, Nejdet Yilmaz, Hasan Kamil Yilmaz and other scientists have also covered the issue of the impact of Ahmad Yassavi's creativity on the Turkish poet Yunus Emre.

From some sources and poems it is known that Yunus Emre was born from 1240 year, lived 80 years, died in Eskishahar-Sarikuy (now Yunus Emre) and was buried here. Yunus Emre is a person who received madrasah education, knew Arabic and Persian well, studied the sciences of the Quran and hadith deeply, was a mature fanatic scientist of his time. In the XIII century, he came Anadolu from Khorosan and studied the teaching of sufism from such masters as Haji Bektash Vali and Taptuk Bobo (Taptuk Emre).

Before us, his work "Devon", which contains more than 400 poems, was written in the form of masnavi in the spirit of a sufi sermon called "Risolatun-Nushiyya" (Treatise of fertilizer).

He lived a dervish life and traveled to the territories of Azerbaijan, Iran, Anaduli [3, 286].

Since the X century, when religious-mystical works were called wisdom, the poetic genre was not considered, but didactic-philosophical content was taken into account. And the emergence of poems called wisdom is directly related to the personality and activity of Khoja Ahmad Yassavi. Yassavi called the poetic pendants, which he himself said, "wisdom". Poems called "wisdom" played an important role in the literary, spiritual and educational life of our people.

In "Devoni hikmat" there are examples confirming that the pandnoma is a poem, which is sung by hikmat - Ahmad Yassavi:

Қул Хожа Аҳмад қиёматдин айди муни,

Ҳикмат қилиб халойиққа ёйди муни,[4, 114]

«ҳикмат қилиб» деганда назмга солинганини эътироф этган.

Wisdom poets keep their poems written in the style and spirit of yassaviyya in accordance with tradition and call it "wisdom". They admit that their poetry is wisdom. For example, the poet of the XVI century wisdom Ubaydi:

Ҳикмат аҳлидек агарчи айтадур ҳикмат вале,

Қул Убайдий бор дурур шарманда ўз гуфторидин, [5, 356]

He calls his poems wisdom.

In “Devon” of Yunus Emre «Маним турур бу жумла иш, ҳикматларимла ёзу қиш” has such misra. He calls his poems "wisdom", like Ahmad Yassavi and his followers, constantly emphasizing that he was engaged in saying wisdom.

When yassavi's followers say wisdom, they mean not a poem of didactic-philosophical, aphoristic content, but exactly "Devoni hikmat" and ashor written on it. In the creativity of wisdom Ahmad Yassavi, a special genre of poetry was formed.

In his work "Tazkirai Qayumiy", Pulotjon Domulla Qayumov calls the poems "navhali ashor", which is read in a special musical tone [6, 562]. Wisdom as a separate poetic genre has the following characteristics:

1. Weight feature (finger is written in the poetry system) 2. Syncretic feature (pronounced in combination with words and music) 3. Style feature (hoop). 4. Feature of ethno-ritual. (In the sessions of the remembrance to be said by heart as to the people and later to be organized special rituals for reading wisdom). 5. Performance feature. (Proverbs are read by a speaker and singer with special abilities).

Poems in the genre of wisdom differ from other poetic genres in that they are primarily written in the finger system. In "Devoni hikmat" there is an inner rhyme, gazal shaped gazals in which each verse consists of fourteen syllables. These proverbs are four misra, seven syllables in each misras are repeated, the finger is written in the seventh Category (4+3).

4 3

Мунда ўзин / билгонлар, 7

Ҳаққа қуллуқ / қилгонлар, 7

Ҳақ йўлига / киргонлар, 7

Ёруқ юзли / бўлғуси. 7

Yunus Emre used the seventh category in his poems:

4 3

Жон бўлгил /жон ичинда, 7

Қолма гумон / ичинда. 7

Истаганинг / топарсан, 7

Яқин замон / ичинда. 7

Yunus Emre continued his poetry weight in accordance with the traditions of Yassavi. Also actively applied eight (4+4), sixteen (8+8) constellations of the finger system.

Another feature of the genre of wisdom is the performance in a musical tone. We tested the musical reading style of proverbs in the experiment. We have brought to the attention of national music scientists. We have shared experience. We saw it playing. Proverbs were performed on the curtains of earnings and brains, like some folk songs. Since the poem retains its features of rhythm, literature belongs to the genre.

In the land of Anaduli, the main factor in the formation of poems, which are called "divine", "breath", "meaning", is the genre of wisdom. Because the poems of Yunus Emre, also called "divine", also performed music.

Another feature of the genre of wisdom is the expression in the folk style. Ahmad Yassavi, through his wisdom, founded the Turkic style of Uzbek classical literature. Turkian, that is, the national enlightenment, has become the main style of creativity of literature. The folk style in the poetry of such creators as Boborahim Mashrab, Sufi Olloyor, Khujanazar Huvaidu, Ziyovuddin Hazini came into existence on the basis of the same tradition. The most basic feature of educational literature in Ahmad Yassavi's poetry is that it is written in harmony with the general public. In wisdoms, folk poetry is based on the weight and tone, the effective use of Turkic words, the use of existing speech units, proverbs and phrases in the language of the people living, the tashbeh of events encountered in the everyday life of ordinary people, their choice as a representation, etc. are the main factors that have caused the Turkish style.

Books such as “дўстлар”, “эй, ёронлар”, “Қул Хожа Аҳмад айтди буни”, “Қул Хожа Аҳмад сўзин эшит” which are often found in "Devoni Hikmat", have risen to the level of creative method in Ahmad Yassavi's wisdom. In Yunus Emre poetry, too, we see the phenomenon of

exposure to Yassavi from the specific art of exclamation: “Юнус Эмро айтур буни”, “Эшитинг, эй ёронлар”, “... хабарин айтдим, эшит”, “шарх ила айтдим, эшит” and so on.

It should be noted that "Devoni Hikmat " and Yassavi followers have a common feature in their works. This is a state of regret for one's own sins and shortcomings. This is not a weakness, in fact, a sign of courage, the first step that the solic has taken in perfection. Yassavi and reproaches are a common aspect of the currents. In many poems of Yunus Emre, including in the verse ""“Ёрлақагил, сен Юнусни, гуноҳкор қулларинг ила”, the same mood is expressed. Aliases used in Ahmed Yassavi wisdoms-"Qul "(Qul Khoja Ahmad), "Miskin” (Miskin Ahmad)are assigned a spiritual, educational and psychological task. He encourages the reader to repent because of the sin and writings he has done.This creative method, which is also inherent in the literature of enlightenment in the poetry of Yunus Emre, in many places. He also followed Yassavi and used the nickname "Miskin":

Мискин Юнуснинг жони, тўрт табиат ичинда,

Ишқ ила жон сирригапинҳон боргим келади,

Yunus Emre as an outstanding poet achieved a wider artistic expression in his poetry than Ahmed Yassavi, teaching "tawhid", "vahdat ul-wujud". At the same time, Mansur Halloj expressed the phenomenon of "Anal haq" through the method of bringing talmeh in accordance with the tradition of "Devoni hikmat":

Унда маст бўлганларнинг, “Анал Ҳақ”дир сўзлари,

Ҳаллож Мансур кабидир энг камина девонаси

The main theme of Yunus Emre's poetry is love and affection, as in the "Devoni hikmat". His poems on the theme of love and affection characterized by the fact that Ahmad Yassavi is much more enthusiastic and excited about his wisdom, said in a state of attraction. At the same time, in his poetry, thoughts in harmony with "Devoni hikmat" are expressed artistically, such as “Ишқ йўлида жон бермоқ”, “Дўст йўлида жаҳд айламоқ”, “Жон ва кўнгилда дўст севгисини пинҳон тутмоқ”, “Ишқ йўлида нафс орзусидан кечмоқ”, туну кун риёзатда бўлмоқ, суҳбат ва хилватда тиз чўкмоқ”, “Ишқ йўлида Дўст жафосига сабр қилмоқ”.

One of the criteria that shows the tradition of follower to Ahmad Yassavi is the wisdom written by wise poets.

One of the followers of Yassawi, Qul Sulaymon's «Эшитгулик дўстлар дуо қилмиш керак», Ubaydi's “ичинда”, «менга сен ўқ кераксан», «Кўч айладик, эй рафиқ», «Ҳақ ишқининг телбаси», Miskini's “Сўфинақш бўлдинг вале ҳаргиз мусулмон бўлмадинг”, Khudoydod's «Ё илоҳим нечук сени тобғой мано» and dozens of other proverbs "Devoni hikmat" with poems in the same weight and expressed in form, subject and idea.

Аҳмад Яссавийнинг “ичинда” радифли ҳикмати:

Холиқимни истарам тун кун жаҳон ичинда,

Тўрт ёнимдин йўландум кавну макон ичинда.

Тўртдан еттига етдум тўққизни бир ер этдим,

Иккидан ўнга етдум чархи кайвон ичинда.

Yunus Emre in "Devon" proves that he continued his yassavi tradition of connecting the verse to some poems in the "Devoni hikmat":

Жон бўлгил жон ичинда, қолма гумон ичинда,

Истаганинг топасан, яқин замон ичинда.

Руку, саждада қолма,амалингга ишонма,

Илму амал ғарқ бўлур, нозу ниёз ичинда.

Despite the fact that Yunus Emre grew up as a great thinker poet with his creative style and pencil, he continued the traditions of "Devoni hikmat" in his creativity. This phenomenon should be viewed as a COURTESY OF THE TRADITION OF SCOUTING.

CONCLUSION

In conclusion, in the work of Yunus Emre there are the following principles of the traditional Yassavi tradition: 1) the tradition of theme and idea; 2) the tradition of language; 3) the tradition of style and tone; 4) the tradition of image, model and expression; 5) the tradition of the poetic system.

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EXPRESSION OF ARTISTIC IDEA IN MODERN UZBEK PROSE BY MEANS OF THE COLOR OF SUBJECTS

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ABSTRACT

This article is about the symbolic significance of the use of color in subjects in an artistic work. In the story of the modern Uzbek prose Abdulla Qahhor "Тўйдаги аза" and Shukur Kholmirzaev "Яшил Нива" color application in the precmets is studied. It is determined that the directed towards the manifestation of a deep philosophical-aesthetic creative idea, which is opposed to the traditional symbolic expression of color, indicating the psychological dramatism of the personality of the former saline period.

KEYWORDS: *Modern Uzbek Prose, Expression, Image, Color, Symbolism, Portrait, White, Red, Blue, Green, Creative Idea.*

INTRODUCTION

"Any color can be read as a word or interpreted as a signal, a hint or a sign," [1.18]. In fact, people have long known that colors have special meanings, hidden meanings. Symbols of colors have a long history. This is reflected in legends, fairy tales, ancient legends, belief and superstitions, the traditions of our ancestors. At the same time, colors symbolized not only mavhum concepts, but also specific phenomena: for example, the social state of people, their different psychological states. It manifested itself in the choice of clothes of a certain color, folk words, rituals, etc. Different peoples have created a certain symbolism, in which colors are preserved to this day. Gyote noted that "each color has not only a psychophysical and symbolic meaning, but also "emotional", "moral influence"[2.200]

The application of color in modern Uzbek prose began to be closely scaled with the teaching of genres, which were to changes in spiritual life.

MAIN PART

If in the stories of the Uzbek prose, which were updated at the beginning of the XX century, mainly colors were used simply for the external image in the expression of objects, then in the later period this process began to be oriented for a much broader expression of meaning. We will be able to observe a mature example of this, especially on the example of the work of the word master Abdulla Qahhor. If we are to periodize the use of color in modern Uzbek prose according

to their artistic and aesthetic significance, then its second period is undoubtedly associated with the work of Abdulla Qahhor.

In modern Uzbek prose, it was characteristic to limit the use of colors mainly by the expression of portraits and objects. But Abdulla Qahhor was able to use them as an important factor in the expression of an artistic idea, without simply giving up the color of portraits and objects, harmonizing the features of symbolism. As a vivid example, it is possible to bring the story “Тўйдаги аза” .

Basically three colors are involved in the story: white, red and blue. Each color has a deep ideological-philosophical place in the three periods of the story, combining around itself a complex of aesthetic views inherent in the symbolic expression of this color.

When each color "activity" begins, it is immediately noticeable that a second psychological environment limit begins.

The main hero of the work is docent Mukhtarhan. The work begins with giving his description in a portrait.

"Docent Mukhtorkhon Mansurov is a hot, incredibly sociable old man, so sociable that the person who saw him would have said that every season has its own subtleties, not only about the seasons, but also about the seasons of life. His one-two black left-handed white turtleneck beard... Shut up and see if the beard is so good to a person, too!.."[3.315]

In the story, we observe that the symbolic expression of the white color, which represented the beard of teacher Mukhtorkhon Mansurov, served to establish the attitude towards the interpretation of the whole person. It is known that white color in our people means innocence, whiteness, purity. And the concept of "whitewash", which he entered in a state of stagnant attachment with a beard, means wisdom. It is understood that docent Mukhtarov is the most respected person in the neighborhood.

The kulmanation point in the dynamics of the plot of the work also occurs again in the color medium. These are the scenes associated with the teacher to marry. The scene associated with the first white color closes: "meanwhile, teacher appeared a week after going off the cliff. The people in the teapot, who saw him coming down from the bus, remained; the old man broke his beard, such a beautiful beard, with in! There was no one left who did not feel sorry, offended."[3.316]

It turns out that with the "extermination" of the beard, the "teacher" also loses its qualities, which symbolizes the white color.

The red color is now entering the work reality scene. Red color is manifested by the combination of both symbolic and natural, and artistic-aesthetic properties. It turns out that the red color begins directly from the scene of the covenant "teacher" to marry.

Teacher has spread the saying that marrying her studentship is a twenty - year-old woman. [3.317]

In its symbolic meaning, red color symbolizes joy, enthusiasm. And by Abdulla Qadiri (also in the symbol of the wedding in our national culture), the red color is opposed to the traditional symbol, negative concepts are used within the framework of the exodus.

While staying close to the wedding, the bride went to the Atele at the beginning of the street, where she was ordered a shirt, what she saw from the women who found out about it. The bride, in fact, is young, but as if she is fat on interest yum-round; on her shoulders is a sleeveless red dress, on her head is like the crown of a popushak, but a red hat; a bag in her hand, a feather in her leg is also red. [3.317]

As a result, the mood of the work, in which the red color comes out:

One of the women who watched him head-to-head with hostility and hatred, turned and walked out of the atele:

- Die not like a cock candy! - he said.

– Let lick the cock candy in the old time, too, die! - said another one.

This nickname immediately broke up. He hated this woman who stole the pleasure of the neighborhood by beating her hand at the domla, extinguished the lamp, which always illuminates the hearts of people, with an indignation that pierces the stone, both he and he did not see. This anger began to rot the feeling of respect and love for the teacher in the hearts of people. When people say teacher, it became sad. Teacher, he must have noticed that, as far as possible, was eager to remain invisible to the eyes of people. [3.317]

A month after the wedding, the bride had a strange grief: sometimes at night the remained choking; as long as it was visible to the doctor, the doctor said, "the cure for this trouble is the sea air."Teacher ran from the morning to my office the next day, before four o'clock she handed over the train ticket with voucher to the bride.

In the evening, a taxi to the door was cross-country. [3, 318]

Entering the scene of the work, the "blue taxi" with its color makes a big turn in the plot of the work. According to our national-religious views, the blue color is interpreted as the color of mourning. (Wearing blue in mourning, tie a blue crochet in front of the house). The writer makes fruitful use of the tragic scene in the plot of the story together with the "cock candy", which is characterized by the negative symbol expression of the blue color, the negative aspects of the red color.

"Teacher, despite the fact that he was exhausted all day long by the hand, took two heavy suitcases to the car himself and put in her luggage with his own hands; he put on the same sleeveless red shirt, a red hat and opened the door of the car to the bride, who again came out of the yard as a cock candy, and then"[3.318]

The end result is known, as a result of the fact that the blue car will serve more than its own capacity to the "cock candy" dressed in red "teacher... die mold!"[3.318]

So we observe the following important aspects of the colors in the story that have arisen:

1. White (positive environment) (white beard "teacher")

2. Red (negative environment) ("cock candy")

3. Blue (tragedy) (blue car)

So it turns out that in the story Abdulla Qahhor was able to use mainly the symbolic feature of the three colors in a fertile way in expressing an artistic idea. He did not limit himself to the use of color expression in describing such external manifestations as something-an object, a portrait, through which the color is used as an auxiliary factor.

Another bright example of highlighting an artistic idea by means of a subject color is observed in the story of the writer Shukur Kholmirzaev called “Яшил Нива”. In the story, the green color with "Нива" is used together on the 5th place, which also performs a specific linguistic function in the plot. The essence of the work is also manifested in the psychology of the philosophical-symbolic mushad hero in the framework of the symbolic expression of the green color through this green "Нива" sentence.

Somehow, like me personally, there is an educated all there. And I want to be spoken (Let sadqai go to be spoken!) "dictator official" can also be found in other regions. Ultimately, even the seeds of green "Нива" flourished. And there are many such high-pitched dawans in our republic.[4]

Green color symbolizes vitality, life in relation to its traditional symbolic expression. Like in the story of Abdulla Qahhor "Тўйдаги аза", in this role we will meet the situation, which is opposed to the traditional symbolic expression of colors.

The green "Нива" cited by the writer as a symbolic expression of the "dictator officials" who have taken root in society. In the game is basically just what is brought to the image of the green "Нива". The reader cannot see, he does not even know who is inside the machine, as the hero of the work did not stare. But in his heart, comes to the riddle through exactly the same green color.

"Well, we were going through a turn, so the tortuous blossoming apples reached a single green "Нива" through it-but it got in front of us and started to go slow. Ne see by eye, as if that's the car! Famous car!..

Thus, although the green "Нива" has fallen on the road, began to go very slowly. Of course that's the machine. From the side-data, the antennas are removed, which means that there is also an racy inside. The machine itself is deng, new. But as it turned out from the side, the rear window was loy, so it was not visible how many people were sitting inside. [4]"

It can be understood by the author that the "Нива" is directed to a deep philosophical-symbolic solution from the issuance of exactly green. That is, here the green color is pointed to green in the style of the creature, which lives in any conditions, rather than a positive symbol of life. In a word, the concept also arises, as if referring to the slime that presses on clean water bodies.

Despite the fact that the green "Нива" is imitating, the heart does not bet that the hero of the work chased him. Those who chased him will be aware of what days have fallen on his head.

Although during the case of the work, the hero of the work heard from the DDN that the dictator was besieged, he would not dare to chase the green "Нива", which by chance was exterminated.

Thus, although the green "Нива" has fallen on the road, began to go very slowly. Of course that's the machine. From the side-data, the antennas are removed, which means that there is also an racy inside. The machine itself is deng, new. But as it turned out from the side, the rear window was loy, so it was not visible how many people were sitting inside. [4]"

"So, while the green “Нива” got down to the road, began to go very slowly. Of course that's the machine. From the side-data, the antennas are removed, which means that there is also an racy inside. The machine itself is deng, yap-new. But as it turned out from the side, the rear window was loy, so it was not visible how many people were sitting inside. [4]"

Through this landscape, which is the most kulmination point in the work, he manages to shed light psychology of the people in the same former saline society.

CONCLUSION

Hence, in the story of Shukur Kholmirzaev “Яшил “Нива”, Green was used more productively in expressing negative symbolic concepts than the traditional positive symbol.

Well, in modern Uzbek prose, the psychological dramatism of the person of the former society of Soviets is exposed by means of the symbolic expression of the colors of the subject.

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A REVIEW PAPER ON IOT SECURITY

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ABSTRACT

Wearable gadgets, household appliances, and software may now exchange and transmit information over the Internet thanks to the Internet of Things (IoT). Given the enormous quantity of private information included in shared data, maintaining information security on shared data is a critical problem that must not be overlooked. In this article, we start with a basic overview on IoT information security and then go on to the information security issues that IoT will face. A world where physical items are seamlessly linked into the information network, and where physical objects may become active participants in business processes. The varied and large-scale devices and networks that differentiate IoT security issues from traditional ones are the main features. These two qualities, heterogeneity and complexity, make IoT security much more difficult. In this essay, the present challenges and research opportunities in IoT security were addressed. Finally, we'll discuss research areas that may lead to future work on solutions to the security problems that the Internet of Things faces.

KEYWORDS: *Communication, Information, Iot (Internet OfThings), Security, Software.*

1. INTRODUCTION

When the phrase "Internet of Things" (IoT) was originally coined, one may wonder what exactly constitutes "Things." Until recently, many groups of academics and organizations attempted to define the Internet of Things. “A world where physical items are seamlessly linked into the information network, and where physical objects may become active participants in business processes,” Haller suggested as an IoT definition. Sarma define "Things" as "physical things that represent identities with Internet connection" in order to broaden the scope of the IoT concept. Figure 1 shows the IoT Security[1].

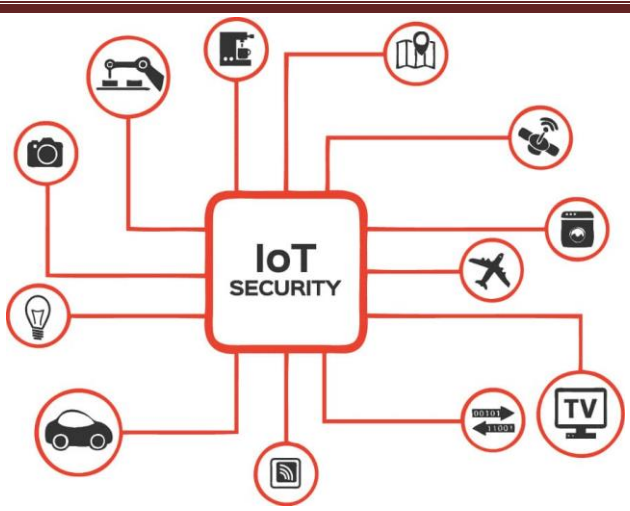

Figure 1: The above figure shows the IoT Security [opensourceforu].

Despite the fact that the IEEE IoT Initiative is working on a white paper for a formal definition of IoT, there are currently no standard definitions. We describe a "Thing" on the Internet of Things in this article as a physical or virtual item that connects to the Internet and may interact with humans or other things[2].

New security problems emerge as the Internet of Things expands, while existing security vulnerabilities become more severe. The heterogeneity and enormous size of the items are the primary causes. The effect elements are further split into two categories: the variety of the "Things" and the "Things' communication." It is split into two groups due to the fact that each category has its own set of security issues.

First, the “Things” have a security issue because of vulnerabilities caused by poor software design, which allows malware or backdoors to be installed. Because of the variety and size of the “Things” in the Internet of Things, such security issues are more complicated than the ones we have today.

In terms of the “Things’” communication medium, the networking environment for IoT is anticipated to be diverse. Various types of communication medium may confront different security issues. The availability of the "Things" will be jeopardized if these security issues are ignored. In terms of communication content, the diverse data format and protocols make content security more difficult. The author will quickly discuss relevant IoT research topics in this post, as well as the difficulties that these research areas face[3].

1.1 IoT Security Research in Progress:

The current study topics covering elements of IoT infrastructure, cryptography, software vulnerability, malware, and mobile devices will be briefly discussed in this section.

1.1.1 Identifying and finding objects in the Internet of Things:

The ability to uniquely identify an item came first, ahead of other security concerns. The basis of IoT is a good identification mechanism. An ideal identification technique not only uniquely identifies things, but also represents their properties. DNS (Domain Name System), for example, is a suitable identification technique that uniquely identifies a host on the Internet, as well as represents the host's property via FQDN (Fully Qualified Domain Name) naming policy and offers address mapping through DNS resolution. The EPCglobal board released Object Name Service (ONS) in 2005, based on the success of DNS, to find the information and services associated with a particular Electronic Product Code (EPC). The ONS concept suggests that a framework similar to this might be used for IoT item identification[4].

The network location of the items is also essential since they are linked to the network. IPv4/IPv6 is now the most commonly utilized locating technique. Despite the fact that IP addressing may still be a contender for the future Internet, Named Data Networking (NDN) is suggested as a naming infrastructure for the Future Internet Architecture (FIA). NDN is a data-oriented approach that mixes naming and addressing, with packet routing based on object names directly, as opposed to host-oriented IP addressing[5].

1.1.2 Authentication and Authorization in the Internet of Things:

Another significant topic of study is how to authenticate the items. Authentication has traditionally been accomplished using a variety of techniques, including ID/password, pre-shared secrets, and public-key cryptosystems. Access control may be database-based or crypto-based to obtain authorization.

Traditional authentication and authorization techniques may not be relevant in the IoT due to the variety and complexity of the devices and networks. Authenticating and authorizing using cryptographically pre-shared keys, for example, is not possible. Key management will become a tough job if the number of items grows quickly.

Despite research efforts to address the issue of object authentication and authorization, no common agreements or standards exist in this field.

1.1.3 Privacy in the Internet of Things (IoT):

At this time, data about user activity while surfing the Internet is being gathered in order to improve the user experience. In the case of IoT, data gathering is not restricted to Internet surfing activity; data about a user's daily routine is also gathered so that the "Things" around him or her may work together to offer better services that meet personal preferences[6].

In the event of misuse of personal information, maintaining the privacy of the acquired data is a problem that has to be addressed.

1.1.4 Lightweight Cryptosystems and Security Protocols:

Sensor nodes, smart gadgets, and wearable devices are examples of resource-constrained IoT devices with limited processing power and battery capacity. Many suggested cryptosystems and security protocols are safe and resilient; however they may not be appropriate for resource-constrained devices. For example, some recent study has focused on this topic.

1.1.5 Analysis of Software Vulnerabilities and Backdoors in IoT:

Software vulnerability, in addition to authentication and authorization issues, is a major focus of contemporary security research. Programming errors created by developers are inevitable throughout the development stage of a piece of software. Software vulnerabilities are bugs that result in security issues. When new software vulnerabilities, often known as zero-day vulnerabilities, are discovered, attackers may use this information to exploit a huge number of computers.

System architectures are comparable across devices in the conventional PC sector. The business market, for example, is dominated by the Windows operating system on x86 platform architecture. Developers may concentrate on the mainstream and use well-known software. As a result, with appropriate education, security awareness in software development is very simple to implement. Diverse hardware platforms and bespoke operating systems make it challenging to train programmers on security awareness in the heterogeneous IoT. Furthermore, as software complexity grows at an exponential rate, it is more important than ever for software engineers to pay attention to every element of safe programming. At this time, a lot of research studies have shown that IoT devices are vulnerable to attackers[7].

Software vulnerabilities may be discovered via program analysis before a product is published. The dynamic analysis method of monitoring the targeted program in a controlled environment is an effective way for verifying a program. Many sophisticated analysis methods, like as taint analysis and symbolic execution, are made possible by it. Because of the resource restriction, these analytic tools, which often need a lot of processing power, are incompatible with IoT devices.

Furthermore, the majority of these sophisticated analytic methods are extremely reliant on the system platform.

Building these analytical methods necessitates bespoke development for many platforms in a variety of IoT settings.

Software flaws may result in a variety of backdoor issues. First, attackers use software vulnerabilities to carry out harmful intentions without leaving any trace on a victim's machine. As a result, attackers may install a backdoor in a susceptible device to gain control of it. Because of the resource limitations of IoT devices, security methods such as intrusion detection systems (IDS) and antivirus, which need a significant amount of computing power, are not suitable. As a result, injecting a backdoor onto a victim's computer is very simple for attackers. Another kind of backdoor is one that is purposefully introduced into a software package for management or testing reasons by suppliers. However, attackers may find and exploit these backdoors to steal user data. Using reverse engineering methods, a skilled opponent may analyze code and find this kind of backdoor. Although users may inspect the gadget before to deployment, doing so takes reverse engineering expertise and a considerable amount of human work. Furthermore, the evaluation must be repeated in the event of system updates. When software receives patches for security upgrades, this process becomes a daily activity. As a result, this kind of backdoor is simple to set up yet difficult to detect. That is the primary reason why certain government agencies place restrictions on the use of untrusted devices[8], [9].

1.1.6 Malware in the Internet of Things:

Symantec verified the discovery of the first IoT malware, Linux, in November 2013.

Darlloz, who brings up the malware problem in the context of IoTsecurity.IoT services take advantage of the high level of connection among different devices, while also enticing attackers as a hotspot for broadly disseminating their virus. Any infected IoT device connected to a susceptible user may contaminate a device owned by the victim, allowing the attacker to move one step closer to the targeted vital device and the enormous data of interest it stores. Malware may also just hide in an end-device, which is seldom equipped with robust security protection, enabling long-term profiling/control of IoT devices such as surveillance cameras, in addition to the fast dissemination advantage. This is a major breach of Internet users' privacy. Previous research studies also address the potential dangers posed by malware to IoT devices and emphasize their significance. To our knowledge, however, there is currently very little study devoted to the countermeasure of IoT-targeted malware. The reason for this may be due to the limited number of real-world IoT malware cases, making it difficult to generalize an effective remedy. Regardless of Linux's existence. Darlloz claims that IoT malware is no longer a fictitious foe, but a real danger to IoT devices. In the Internet of Things, the danger of malware and countermeasures will become important, and they must be handled[10].

1.1.7 Android Operating System:

The Android platform, which is the most popular mobile operating system, has dominated the mobile market. More and more smart gadgets based on Android have been created as personal assistants, which have undoubtedly dominated the IoT. The Android platform drew the attention of IoT developers in various ways due to its open and embedded-system focused architecture.

Many Android features, including as battery conservation, near-field communication, multi-sensors, and voice control, have been incorporated in IoT devices. Android, for example, has long been a component of the Internet of Things. Despite the presence of other competitors like as Apple iOS, Windows Phone, and Mozilla Firefox OS, Android is backed by a huge developer community that is propelling IoT in a variety of directions.

2. DISCUSSION

The author has discussed about the IoT Security, when the term "Internet of Things" (IoT) was first created, many people wondered what precisely "Things" meant. Many scholars and organizations tried to define the Internet of Things until recently. As an IoT definition, Haller proposed "a future where physical things are seamlessly connected into the information network, and where physical objects may become active players in business operations." To expand the scope of the IoT idea, Sarma defines "things" as "physical objects that represent identities with Internet connectivity." As the Internet of Things grows, new security issues arise, while old security flaws become more serious. The main reasons are the objects' heterogeneity and huge bulk. The impact components are further divided into two groups: "Things' diversity" and "Things' communication." Because each category has its own set of security concerns, it is divided into two categories.

3. CONCLUSION

The author has concluded about the IoT Services, The diverse and large scale devices and networks are the key characteristics that distinguish IoT security problems from conventional ones. IoT security is made considerably more challenging by these two characteristics, heterogeneity and complexity. The current problems and research possibilities in IoT security were discussed in this article. New research subjects are also addressed, as well as potential solutions.

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AN OVERVIEW ON BLOCKCHAIN AND ITS APPLICATIONS

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ABSTRACT

Since the advent of Bitcoin, the first and biggest cryptocurrency, blockchain technology has been recognized as a digital currency platform. It has previously been used for decentralization of markets in general, rather than just decentralization of money and payments. A distributed system has several advantages, including increased computing power by combining the computing power of all connected nodes, increased reliability due to the lack of a single point of failure, and so on. The blockchain's decentralized transaction ledger may be used to register, confirm, and transmit various types of contracts to other network participants. We fully examine state-of-the-art blockchain-related applications that have appeared in the literature in this article. A number of previously published publications were carefully considered for inclusion based on their contributions to the blockchain body of knowledge. In the last part of the article, many points are examined and debated.

KEYWORDS: *Applications, Blockchain, Cryptocurrency, Software.*

1. INTRODUCTION

A software system can be classified into one of two architectural approaches: centralized or distributed. The nodes in a centralized software system are spread out and connected to a single central coordination node. A distributed system, on the other hand, consists of several interconnected nodes with no single point of control. However, there are several disadvantages to a distributed system, including communication overhead and security issues related to untrustworthy nodes abusing network access.

Meanwhile, blockchain can be viewed as a component of a distributed software system's implementation layer. Blockchain can be used to achieve and maintain data integrity in distributed systems. Furthermore, blockchain can be thought of as a purely peer-to-peer system composed of individual nodes in a network. In peer-to-peer systems, dishonest and malicious peers become the most serious integrity threat. Because unknown peers with unknown reliability and trustworthiness may exist, individual nodes try to exploit the system for their own purposes. As a result, blockchain is required to address these important issues[1].

Initially, blockchain's main application was to link cryptocurrencies to traditional banking and financial institutions. Blockchain technology creates a new banking ecosystem, allowing financial institutions to conduct transactions directly between themselves without the need for central authorities or intermediaries. Every transaction must be verified by the consent of more than half of the network's participants. This means that no participant can change any data on the blockchain without the permission of other participants[2]–[5].

The purpose of this paper is to provide and explore information about blockchain technology and its current applications in the real world. The paper categorizes published works in the literature, such as academic journals, conferences, technical reports, and so on. Several studies on blockchain technology have been conducted as part of review studies. Most studies, on the other hand, have not included a comprehensive discussion of blockchain-related applications.

1.1.Fundamentals of Blockchain Technology:

Blockchain is a type of distributed ledger (data structure) that stores transaction or event information. It is copied and shared across the network's members. Since blocks are added and linked to the preceding block using a hash function, the chain's size continues to grow. To generate a hash, a cryptographic hash function is needed. Bitcoin, for example, employs the SHA-256 algorithm, while Litecoin and Primecoin use the Scrypt and Cunningham chains, respectively. It also allows us to quickly check the input mapping to a particular hash value. It would be impossible to have the same hash for two distinct inputs.

A network node (user) validates and preserves the ledger in the blockchain using a consensus mechanism (a set of rules that allows users to reach a mutual agreement), eliminating the need for a central authority or intermediary. Each node maintains a full copy of the ledger. Section III delves into the practical application of blockchain for financial transactions, since the primary goal of blockchain is to address the issues that present in the Bitcoin cryptocurrency[6], [7].

1.2.BlockchainApplications:

The use of blockchain technology in many fields is extensively explored in this section. Furthermore, financial services, healthcare, business and industry, and other new applications have all been classified as such applications.

- **Service in the Financial Sector:**

The blockchain technology has been widely used for financial transactions, or cryptocurrency. Cryptocurrencies have become popular software systems in recent years. The initial transaction is included in the first block, often known as the genesis block. The first block's hash is sent to the miner, who uses it to create a hash for the second block. Similarly, the third block generates a hash that includes the previous two blocks, and so on. The genesis block may be traced back to all subsequent blocks on the blockchain[8].

Cryptocurrency has its own monetary system (coin). The process of adding a new block to the blockchain is known as mining. Each node checks the blockchain to see whether the currency is genuine and hasn't been spent yet. A larger number of parties must agree before the transaction records are added to the blockchain. Because the mining process consumes a lot of resources, it's difficult for an attacker to verify an incorrect transaction. Each mined block is checked to determine whether it contains a valid proof of stake or proof of work.

- **Healthcare:**

Blockchain offers enormous promise for solving the existing health-care system's interoperability problems. It may be used as a standard to enable stakeholders such as healthcare organizations, medical researchers, and others to securely exchange electronic health records

(EHRs). Sharing EHR allows us to improve the quality of medical treatment and improve doctor recommendations, for example.

However, managing healthcare data, that is, collecting, keeping, and analyzing it, is not an easy job, especially when privacy concerns are involved. Healthcare information should not be shared with anyone else since it may be used fraudulently by malicious users or attackers.

To address these concerns, a healthcare data gateway (HDG) based on the blockchain storage platform has been suggested. It is a smartphone application that allows users to simply manage and restrict data sharing. Users may process patient data using the suggested approach without jeopardizing patient privacy. Furthermore, the data is kept in a private blockchain cloud, guaranteeing that medical data cannot be tampered with by anybody, including doctors and patients.

Following that, the use of blockchain for pervasive social network (PSN) based healthcare is suggested. We can exchange medical data collected by medical sensors via PSN. The authentication protocol between medical sensors and mobile devices in a wireless body area network (WBAN) and the EHR data exchange utilizing blockchain in the PSN area are the two primary security protocols in a PSN-based healthcare system. Medical data transactions, such as node address and medical sensors, are generated and broadcast by each node in the PSN. The miners, on the other hand, are in charge of transaction verification and the production of new blocks.

Finally, proposes a blockchain-based access control system. Identification, authentication, and permission are all part of the access control process. It establishes a state of accountability in which user access can be tracked for what specific activity in a system. After confirming their identity and cryptographic keys, users may obtain EHR from shared data pools using the proposed approach. Identity-based authentication is used to accomplish user authentication. In addition, a lightweight block structure is suggested to improve the existing blockchain implementation.

- **Industry and Business:**

The rise of the Internet of Things (IoT) has offered numerous benefits, including the ability to link things and people. As a result, the authors suggest an e-business architecture that is tailored to the IoT context. The distributed autonomous corporation (DAC) is used for this purpose as an entity that provides transaction services without the need for human involvement. The proposed system's main component is a transaction mode in which peer-to-peer transactions are carried out autonomously, with Bitcoin and IoTcoin serving as the currency and exchange certificate, respectively.

When presenting an agri-food supply chain traceability system utilizing RFID and blockchain technologies, the authors address the significance of food safety and quality. Blockchain is used to ensure that information exchanged and published is accurate and trustworthy. Furthermore, in the age of Industry 4.0, there is a concept known as'smart manufacturing.' Industry 4.0 refers to the ability of goods and services to be shared across networks, such as the Internet or blockchain. In terms of supply chain management, Industry 4.0 is anticipated to bring decentralization and self-regulation to the fore.

- **Additional Implementations:**

The present application of blockchain in a variety of domains, including right management, reputation, digital content distribution, WiFi authentication, and IoT security, is addressed in this section.

The two papers propose and explore a novel decentralized right management system idea based on blockchain technology (BRIGHT). This is in stark contrast to the conventional method, which often involves a central third-party. The suggested system is anticipated to feature a robust anti-attack mechanism and will allow us to reduce customer service costs. Furthermore, a reputation system has a lot of possibilities for assessing our community's trustworthiness. It is calculated using our past transactions and interactions in a network, such as an e-commerce website. By incorporating blockchain into the reputation system, it will be possible to address the main problems that now exist in the system, such as freeloaders..

A new WiFi authentication protocol has been developed. This is based on Bitcoin 2.0, which is a Bitcoin-based alternative cash system. Users must first download and install the Auth-Wallet program, after which Auth-Coins are provided. Tokens are exchanged between users and access points for authentication. Finally, blockchain implementation for smart home security. A private and local blockchain is used to offer secure access control to the IoT devices. The blockchain not only provides a lightweight security mechanism for smart home devices, but it also creates an immutable time-ordered database of transactions. In addition, a smart home miner is a device that processes transactions in the smart home from a central location.

2. LITERATURE REVIEW

Z. Zheng et al. discussed a review on challenges of Blockchain[9]. Decentralization, persistency, anonymity, and auditability are just a few of the advantages of blockchain. Blockchain applications include a broad range of topics, including cryptocurrencies, financial services, risk management, internet of things (IoT), and public and social services. Although a number of studies have focused on different applications of blockchain technology, there is yet to be a thorough assessment of the technology from both a technical and an application standpoint. To close this gap, we conducted a thorough blockchain technology study. This article, in particular, explains the blockchain taxonomy, analyzes common blockchain consensus algorithms, evaluates blockchain applications, and discusses technical difficulties as well as recent advancements in addressing the issues. Furthermore, this article discusses the future paths of blockchain technology.

A. Reyna et al. discussed a review on Blockchain and its integration[10]. Conventional gadgets become smart and autonomous under the Internet of Things (IoT) vision. Thanks to technological advancements, this vision is becoming a reality, but there are still difficulties to overcome, especially in the security sector, such as data dependability. Given the anticipated growth of the IoT in the next years, it is critical to establish trust in this massive incoming data stream. Blockchain has emerged as a critical technology that will revolutionize the way we exchange data. Building trust in dispersed settings without the need of authority is a technical advancement that has the potential to transform a variety of sectors, including the Internet of Things. IoT has used disruptive technologies like big data and cloud computing to overcome its constraints since its inception, and we believe blockchain will be the next one. This article examines this connection, examines difficulties in blockchainIoT applications, and reviews the most relevant research in order to assess how blockchain might possibly enhance IoT.

3. DISCUSSION

Cryptocurrency has been a hot subject for a few decades, with enormous technical capabilities that have drawn billions of dollars in investment. According to the "Global cryptocurrencies benchmarking research," the value of digital money grew by more than three times in early 2016, almost reaching $25 billion in March 2017. Blockchain is a technology that allows cryptocurrency to exist (among other things). The authors of this article discussed blockchain and its characteristics, as well as cryptocurrencies. As with any other technology, there are advantages and disadvantages to it, and Blockchain technology is no exception. Big deals will be

done in cryptocurrency in the future, but when it comes to India, cryptocurrency has a long way to go since there are UPI systems in place now, and maybe transactions will be done in digital currency in the future as well.

4. CONCLUSION

In terms of solving data integrity problems, increasing transparency, preventing fraud, and creating trust and privacy, blockchain technology has a bright future. Finance, accounting, e-government, business process management, insurance, entertainment, trading platforms, healthcare, the internet of things, and law firms, among other sectors, have the potential to be transformed by blockchain technology.

As a consequence, depending on the area or sector in which it is utilized, Blockchain Technology has a lot of promise for providing new solutions, since technical innovation and applications may help achieve economic efficiency and social benefits. However, using Blockchain Technology in a number of industries may be prohibitively costly. To migrate or transfer outdated systems, businesses must invest a significant amount of money. The most recent state-of-the-art research articles on blockchain technology were examined and debated. A number of articles were carefully selected from an internet database and then categorized into various categories. This article provides an overview of current blockchain research as well as real-world applications.

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A REVIEW PAPER ON ARCHITECTURE OF BLOCKCHAIN

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ABSTRACT

Decentralization, persistency, anonymity, and auditability are just a few of the advantages of blockchain. Blockchain applications include a broad range of topics, including cryptocurrencies, financial services, risk management, internet of things (IoT), and public and social services. Although a number of studies have focused on the use of blockchain technology in different application areas, there is yet to be a thorough assessment of the technology from both a technical and an application standpoint. To close this gap, we conducted a thorough blockchain technology study. Other than Bitcoin, blockchain may be utilized in a variety of applications. Blockchain has shown its capacity to disrupt traditional sectors because to its basic characteristics of decentralization, persistency, anonymity, and auditability. This article provides a comprehensive overview of the blockchain. This article, in particular, explains the blockchain taxonomy, analyzes common blockchain consensus algorithms, evaluates blockchain applications, and discusses technical difficulties as well as recent advancements in addressing the issues. Furthermore, this article discusses the future paths of blockchain technology.

KEYWORDS: *Bitcoin, Block, Blockchain, Cryptocurrency, Risk.*

1. INTRODUCTION

Cryptocurrency has recently received a lot of interest from both business and academics. The capital market for Bitcoin, which is generally referred to as the first cryptocurrency, reached ten billion dollars in 2016.

Bitcoin's core mechanism is the blockchain. All committed transactions are recorded in a chain of blocks in blockchain, which may be thought of as a public ledger.

When additional blocks are added to the chain, it continues to expand. Decentralization, persistency, anonymity, and auditability are all important features of blockchain technology. The integration of many fundamental technologies such as cryptographic hash, digital signature (based on asymmetric cryptography), and distributed consensus mechanism allows blockchain to operate in a decentralized context. A transaction may be carried out in a decentralized manner using blockchain technology. As a consequence, blockchain has the potential to significantly reduce costs while also increasing efficiency[1]–[3].

Although Bitcoin is the most well-known blockchain application, the technology may be used in a wide range of applications beyond cryptocurrencies. Blockchain may be utilized in different financial services such as digital assets, remittance, and online payment since it enables payments to be completed without the need of a bank or an intermediary. Furthermore, blockchain technology is emerging as one of the most promising technologies for the next generation of internet interaction systems, such as smart contracts, public services, internet of things (IoT), reputation systems, and security services[4]–[6].

Despite the fact that blockchain technology offers enormous promise for the development of future internet services, it is beset by technical difficulties. To begin with, scalability is a major issue. The size of a Bitcoin block is currently restricted to 1MB, and a new block is mined every 10 minutes. As a result, the Bitcoin network is limited to 7 transactions per second, rendering it unsuitable for high-frequency trading. Larger blocks, on the other hand, need more storage space and take longer to propagate across the network. As people want to maintain such a huge blockchain, this will eventually lead to centralization. As a result, finding a balance between block size and security has become difficult. Second, it has been shown that miners may earn more than their fair share of income by using a selfish mining technique. Miners conceal their mined blocks in the hopes of making more money in the future. As a result, branches may occur often, impeding blockchain growth. As a result, some remedies to this issue must be proposed. Furthermore, even when individuals solely utilize their public and private keys to conduct transactions, privacy leakage may occur in blockchain. It's even possible to trace a user's actual IP address. Additionally, existing consensus methods like as proof of work (PoW) and proof of stake (PoS) have significant flaws. PoW, for example, consumes a lot of power, and the phenomena of the wealthy becoming wealthier may show up in the PoS consensus process. These issues must be solved in the development of blockchain technology.

Blockchain literature may be found in a variety of places, including blogs, wikis, forum postings, codes, conference proceedings, and journal articles. Tschorsch and Scheuermann (2016) conducted a technical analysis of decentralized digital currencies such as Bitcoin. With significant additions to blockchain technical aspects, consensus methods, blockchain applications, research difficulties, and future prospects[7]–[9].

1.1 The Architecture Of The Blockchain:

Like a traditional public ledger, the blockchain is a series of blocks that contain a full list of transaction data. A blockchain is shown in Figure 1 as an example. Each block contains a reference to the block before it, which is basically a hash value of the preceding block called parent block. It's worth mentioning that hashes of uncle blocks (children of the block's forebears) would be kept in the Ethereumblockchain as well. The genesis block is the initial block in a blockchain that has no parent block.

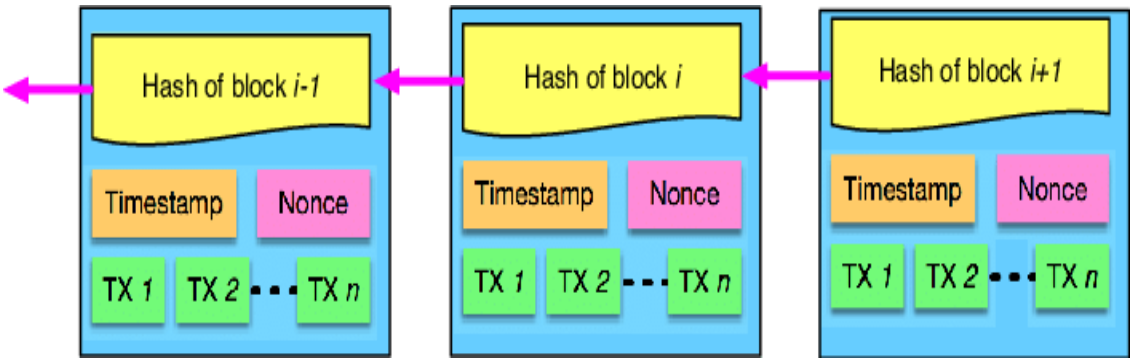

Figure 1: The above figure shows an example of blockchain which consists of a continuous sequence of blocks.

1.1.1 Block:

The block header, in particular, contains the following information:

- The block: specifies which set of block validation criteria should be used.
- Parent block hash: A 256-bit hash value that refers to the preceding block.
- Merkle tree root hash: the sum of all transactions in the block's hash value.
- Timestamp: Current timestamp expressed in seconds since 1970-01-01T00:00 UTC.
- nBits: a concise representation of the current hashing target.
- *Nonce:* a four-byte field that begins with 0 and grows with each hash computation

A transaction counter and transactions make up the block body. The maximum number of transactions that may be stored in a block is determined by the block size and the transaction size. To verify transaction authenticity, Blockchain employs an asymmetric cryptography method (NRI, 2015). In an untrustworthy environment, a digital signature based on asymmetric cryptography is employed. After that, we'll show you how to create a digital signature.

1.1.2 Electronic Signature:

Every user has a private and public key pair. The transactions are signed using the private key. The digitally signed transactions are dispersed throughout the network and then accessed using public keys that are accessible to everyone. Figure 2 depicts a digital signature in the context of blockchain. The signing phase and the verification phase are both included in a conventional digital signature. Let's look at Figure 2 one more. When Alice wishes to sign a transaction, she first creates a hash value from it. She then encrypts this hash value with her private key and transmits the encrypted hash together with the original data to another user Bob. Bob validates the received transaction by comparing the decrypted hash (created using Alice's public key) to the hash value computed from the received data using the same hash function as Alice's[10]. The elliptic curve digital signature method is one of the most common digital signature algorithms used in blockchains.

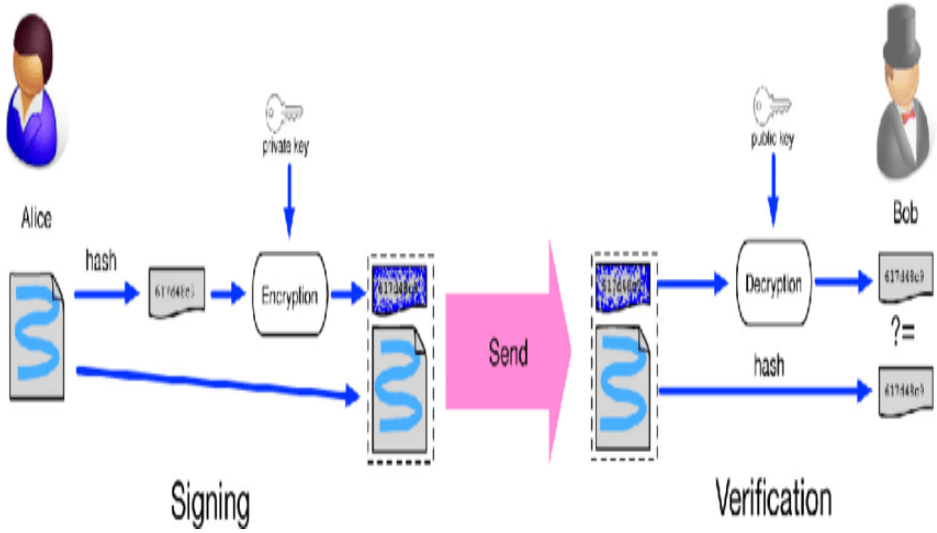

Figure 2: The above figure shows the Digital Signature used in Block chain.

1.2 Blockchains Key Characteristics:

In conclusion, the main features of blockchain are as follows.

1.2.1 Decentralization: Decentralization is a term that is used to describe the process of Each transaction in traditional centralised transaction systems must be verified by a central trusted agency (e.g., the central bank), resulting in cost and performance bottlenecks at the central

servers. A transaction on the blockchain network, on the other hand, may be performed between any two peers (P2P) without the need for central agency authentication. As a result, blockchain may substantially decrease server expenses (both development and maintenance) while also alleviating performance constraints at the central server.

1.2.2 Persistency: It is virtually difficult to tamper with the network since each transaction must be verified and recorded in blocks dispersed across the network. Other nodes would also verify each broadcasted block, and transactions would be verified. As a result, any fabrication would be readily detectable.

1.2.3 Anonymity: Anonymity is a virtue. With a created address, any user may communicate with the blockchain network. Furthermore, a user may create a large number of addresses in order to protect his or her identity. There is no longer a central authority in charge of users' personal information. This technique ensures that the transactions on the blockchain are kept private to some extent. Due to the inherent limitation of blockchain, it cannot ensure complete privacy protection.

1.2.4 Auditability: Users may easily check and track prior records by visiting any node in the distributed network since each transaction on the blockchain is verified and logged with a timestamp. Each transaction in the Bitcoin blockchain may be traced back to prior transactions repeatedly. It enhances the data stored in the blockchain's traceability and transparency.

1.3 Blockchain systems taxonomy:

There are three kinds of blockchain systems now in use: public blockchain, private blockchain, and consortium blockchain. The author examines these three kinds of blockchain from various angles.

1.3.1 Consensus Determination: Each node in a public blockchain may participate in the consensus process. In a consortium blockchain, only a limited number of nodes are responsible for verifying the block. In the case of a private chain, it is entirely under the authority of a single organization, which may decide on the ultimate consensus.

1.3.2 Read Permission: A public blockchain's transactions are accessible to the public, while a private blockchain or a consortium blockchain's read permission is limited. The consortium or organization may determine whether the information kept is public or private.

1.3.3 Immutability: It is a quality that cannot be changed. It is virtually difficult to tamper with the public blockchain since transactions are stored on various nodes throughout the distributed network. The consortium blockchain or private blockchain may be reversed or tampered with if the majority of the consortium or the dominant organization wishes to tamper with it.

1.3.4 Effectiveness: Because the public blockchain network has a high number of nodes, propagating transactions and blocks takes a long time. With network security in mind, public blockchain limitations would be considerably more stringent. As a consequence, transaction throughput and latency are both restricted. Consortium blockchain and private blockchain may be more efficient with fewer validators.

1.3.5 Centralized: The primary distinction between the three kinds of blockchains is that public blockchains are decentralized, consortium blockchains are partly centralised, and private blockchains are completely centralised since they are owned by a single entity.

Consensus Process: The public blockchain's consensus process is open to everyone on the planet. Both consortium blockchain and private blockchain are permissioned, unlike public blockchain. To participate in the consensus process in a consortium or private blockchain, one node must be certificated.

Because public blockchain is accessible to the whole globe, it has the potential to attract a large number of users. In addition, communities are extremely active. Every day, new public blockchains arise. The consortium blockchain may be used in a variety of commercial applications. Hyperledger is currently working on blockchain frameworks for corporate consortiums. Ethereum has also made tools available for creating consortium blockchains. In terms of private blockchain, many businesses are still adopting it for efficiency and auditability.

2. DISCUSSION

The author has discussed about the blockchain, because it allows payments to be made without the need of a bank or an intermediary, blockchain may be used in a variety of financial services such as digital assets, transfer, and online payment. Furthermore, blockchain technology is quickly gaining traction as one of the most efficient methods for the next generation of computer functionality offered, including smart contracts, public services, the internet of things (IoT), reputation systems, and security services.

Despite the fact that blockchain technology has a lot of promise for the future of internet services, it is plagued by technical issues. To begin with, scalability is a significant concern. A Bitcoin block can only be 1MB in size for now, and a new block is mined every 10 minutes. As a consequence, Bitcoin's network can only process 7 cycles per second, reducing the availability for high-frequency trading. Larger blocks, on the other hand, need more storage space and require more time to propagate through the network. People will ultimately want to maintain such a large blockchain, which will lead to centralization. As a consequence, striking the right balance between network capacity and security has become challenging. Second, it has been shown that by adopting a selfish mining method, people may earn more than their fair share of revenue. Mined blocks are hidden by miners in the intention of earning more money in the future.

3. CONCLUSION

The author has concluded about the blockchain, Because of its decentralized architecture and peer-to-peer nature, the blockchain is widely regarded and supported. Bitcoin, on the other hand, protects a lot of blockchain research. However, blockchain may be used in a number of areas other than Bitcoin. With its fundamental features of decentralisation, persistency, anonymity, and auditability, blockchain has proven its potential to disrupt conventional industries. We provide a thorough overview of the blockchain in this article. We begin by providing an overview of blockchain technology, covering blockchain architecture and important blockchain features. Following that, we'll go through some of the most common blockchain consensus algorithms.

The author examine and evaluate these procedures in a variety of ways. We also look at common blockchain applications. Furthermore, we outline some of the difficulties and issues that may stymie blockchain growth, as well as some current solutions. There are also some potential future directions mentioned. Nowadays, smart contracts are rapidly evolving, and a plethora of smart contract applications are being suggested. However, many creative applications are presently difficult to execute due to the numerous flaws and limitations of smart contract languages. In the future, we want to conduct a thorough study of smart contracts.

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BOLSHEVIK POLICY IN PUBLIC EDUCATION: THE NATIONAL EDUCATION SYSTEM AND THE IMPLEMENTATION OF THE SOVIET MODEL IN EDUCATION

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ABSTRACT

As a result of the Bolsheviks' rise to power, so many reforms started to be done not only in the political but also in the social spheres. They had serious aspects especially in education, science, and culture, which are important in changing their minds. Reforming the national education system was not easy, but mandatory.

KEYWORDS: *Turkestan ASSR (Autonomous Soviet Socialist Republic), TASSR CEC (Central Executive Committee), People's Commissariat Of Education, Military Communism, Unified Labor School, Labor School – Communes.*

1. INTRODUCTION

Turkestan had an old system of schools, mosques, qorixonas (places where religious people recited the Koran and small children were taught to do so), otin oyi schools (female schools), and madrassas before the Russian Empire conquered the country. Since the colonial authority established the Governor-General of Turkestan in 1867, the local education system, as well as all economic and political activity, has been under its supervision. The Tsarist administration investigated the local educational system and determined that it posed a threat to colonialism's future. The madrassas, which had played a vital role in Muslim society for generations, were regarded by colonial administrators as "relics of the past" [*1: p. 29*].

2. MATERIAL AND METHODS

Despite the Tsarist government’s policy of Russification and brutality against the local religious education system, traditional religious schools continued to operate, and a new promising principle of national education evolved. With the impact of the 1905 revolution and, in particular, the overthrow of the Tsarist government, the principle of democratization began to take root in the education system.

The Bolsheviks, who came to power after the October 1917 coup, established the Turkestan People's Commissariat of Education in November 1917 in order to terminate the existing system of governance in the education system and build a Soviet model of public education [*2: 34-f,. 1-list, 30-work, 3-sheet*].

The Turkestan ASSR decreed on May 14, 1918, that the education system in Turkestan would undergo fundamental socialist transformation [*7*]. It stressed the importance of establishing a Soviet school that would be suitable for all.

The first alternative in the program plan was the Soviet school model, known as the "Unified Labor Schools", which was adopted by a decree of the RSFSR's Central Executive Committee on October 16, 1918. The unified school was divided into two phases: the first for children aged 8 to 13 (five years of education) and the second for youngsters aged 13 to 17 (four years of education) [*7*].

TASSR CEC issued a directive on the transfer of education in the mother language and published the "Regulations on the organization of Turkestan's schools."

The Republican People's Commissariat of Education's "Student Youth" campaign encouraged both boys and girls to attend school [*5: p. 412*].

Russian language lessons were launched in Turkestan national schools, while "Turkish" language classes were started in Russian schools; the republic's state languages were designated Russian and "Turkish". The teaching of Russian and Turkish in schools became mandatory from the third grade forward, although the study of both languages was optional.

The departments of public education were invited to "contact the local national affairs department to initiate efforts to open Muslim schools in the areas" [*2: 34-f,. 1-list, 86-work, 107-sheet*].

At a time when efforts to reform public education in the country were growing, Mulla Ghazi Yunus Muhammad oglu published an article titled "On the Reform of Madrasas" in the Great Turkistan newspaper [*10*].

According to the authorities, the reputation of religious schools was strong in Turkestan because the majority of the population was made up of locals who were affected by the believers.

The attitude of Bolshevik Soviet authorities in the RSFSR and Turkestan toward the local education system was heavily influenced by religion policy and the RSFSR CPC Decree of January 23, 1918 on the separation of the church and the state [*6: p. 271–274*]. TASSR passed a similar decree on November 20, 1918 [*2: 25-f,. 1-list, 144-work, 34-sheet*].

As a result of the "military communism" strategy intended to suppress the local system, the waqf properties was confiscated, and mosques, schools, and madrassas were abolished. The majority of local youngsters were unable to attend school due to the insufficient number of Soviet schools. By decree No. 6486 of the People's Commissariat of Education of the Turkestan ASSR on December 14, 1918, financial assistance for Muslim schools was terminated, and they were offered a transition to a new methodical system as a first step [*2: 34-f,. 1-list, 34-work, 26-sheet*].

M. Hasanov gave a positive assessment of the activities of schools and madrasas in Turkistan in his article "Autonomy of Turkistan: truth and fiction", and provided accurate information about the liquidation of waqf, the destruction of mosques, and restrictions on the rights of Muslim schools and madrasas by the Soviets [*3: p. 6–8*].

The Turkestan ASSR's People's Commissariat of Education has introduced a new school system. The school, according to the system, is split into three stages: primary (three years), secondary (seven years), and advanced. At the age of seven, a pupil was accepted to primary school. This stage comprises "the first four classes of all lower primary schools, all upper primary schools, and all secondary institutions (gymnasiums, practical schools, commercial schools, and so on)" [*2: 34-f,. 1-list, 25-work, 33-sheet*].

Seven-year schools were to be established in all parts of the Turkestan ASSR in 1918. However, it was impossible to complete this task at the time. The Bolshevik regime was not yet prepared for it, both economically and politically. As a result of the scarcity of local instructors, the establishment of "complete seven-year schools" was made possible. The benefit of this arrangement is that primary schools are entirely free. Soviet schools were formed in lieu of existing gymnasiums and educational institutions as Russian schools were quickly overhauled. There were "labor schools - communes" in addition to secondary schools. V.F. Lubensov was one of the first to establish a labor commune in September 1918. Similar schools were opened in Samarkand, Skobelev, and Kattakurgan in 1919-1920.

The Sovietization of school building may be observed in the fact that, while Soviet schools were first founded mostly in cities, they quickly spread to rural areas by 1919-1920.

3. RESULTS

The colonial regime's political emphasis on women's education began as a "red army struggle for old lifestyle" in the aftermath of the October coup. This may be seen in the way they strive to teach both boys and girls together. The idea, however, was met with significant resistance from the locals. As a result, the Bolshevik regime had no choice but to submit. As a result, it was suggested that separate schools for girls be established. Tashkent hosted the first such school, which enrolled 42 Uzbek women. Later, such kind of schools were founded in Andijan, Kokand, and Samarkand. Tashkent had 12 women's schools and Andijan had two in the early 1920s. At the time, 270 Uzbek and 130 Kyrgyz women were studying in the Kokand area.

The establishment of Soviet national schools was met with a lot of resistance. The restriction of religious schools and the transformation of Russian-style schools led to an increase in their proportion. Six Uzbek schools were established in Skobelov district at the beginning of the 1918-1919 academic years [*8: p. 561*]. Tashkent had 57 schools with 8,500 learners at the time. Over 100 schools have been built for the local community in the Samarkand region.

In the civil war-torn Fergana area, establishing Soviet schools was challenging. Nevertheless, in the "freed" territories, Red Army detachments began to open new sorts of schools. As a consequence, the number of schools in the Fergana area reached 350 at the start of the 1919-1920 academic years [*9: p. 247*].

4. CONCLUSIONS

The financial position of Soviet schools was exceedingly tough, regardless of how politicized the educational activity was. Textbooks and instructional tools, particularly pens, ink, and notebooks, were in limited supply. Furthermore, during the Bolsheviks' fast reform of education policy, there was a scarcity of local staff, which exacerbated the situation. The textbooks weren't perfect also. Furthermore, the brand-new system was met with skepticism by local youngsters. The study's effective operation was hampered by a lack of student discipline.

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FACTORS INFLUENCING ORGANIZATIONAL AND ECONOMIC MANAGEMENT MECHANISMS IN THE CHEMICAL INDUSTRY

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ABSTRACT

The article examines in detail the factors that affect the mechanisms of management. The strategic direction is to anticipate changes in the external environment, identify risks. Operational management– maintaining operational parameters and responding quickly to deviations. Internal and external factors of influence are considered.

KEYWORDS: *Management Mechanisms, Digitalization, Strategic Direction, Operational Direction, Risks, Sustainable Development, External Factors, Internal Factors, Innovations.*

INTRODUCTION

The sustainable functioning of each industrial enterprise, its competitiveness today directly depends on the organizational and economic management mechanisms. Such mechanisms affect the position that the company occupies in the market, the level of its modernization, digitalization and directly on the standard of living of the company's employees.

THE MAIN PART

The ongoing modernization of the economy, the sustainable development of industry in the Republic will lead to a radical change in the role and importance of the chemical industry in the development of production and contribution to the country's GDP. Considering the functioning of industrial enterprises in modern conditions, it is important to take into account such areas as strategic and operational [1]. Both of these areas need to be considered comprehensively. The strategic direction of functioning is the ability to anticipate changes in the external business environment, early identification of risks associated with changes and adaptation, which is preventive in nature to ensure sustainable development. It is necessary to determine the mission of the main purpose of an industrial enterprise and a benchmark for long-term development, diagnose the environment of the enterprise to identify strengths and weaknesses, choose a strategic alternative, taking into account the formation of a promising innovation policy of economic growth of the enterprise.

The operational direction ensures the maintenance of optimal competitiveness parameters and rapid response to deviations. The peculiarities of the production and economic activities of enterprises in various industries create certain specific requirements for these areas.

The chemical industry has a number of features, such as complex chemical processes, dependence on deviations of the process mode, work with harmful and dangerous substances. The main difficulty of management in the chemical industry is the lack and/or unitedness of data on how all highly complex technological processes are going. Management in the industry should ensure full control over complex production, reduce costs, increase profitability and ensure the safety of production. Now the share of the chemical industry in the GDP of the republic is only about 1% [2].

The effectiveness of the organizational and economic mechanism of management of industrial enterprises, which is a complex multi-level system, is influenced by two groups of external and internal factors (Fig. 1).

External factors include political, resource, financial, economic, environmental, socio-demographic, and innovative. These are direct impact factors.

Internal factors include – economic, organizational, production, technical and technological, personnel, social, marketing.

All factors mutually influence and are closely related to each other in the process of economic activity of each of the enterprises. The ratio of factors and their interaction are relevant both for the entire economic system and for individual enterprises. In some specific moments, some factors have a greater impact, while the influence of others may weaken.

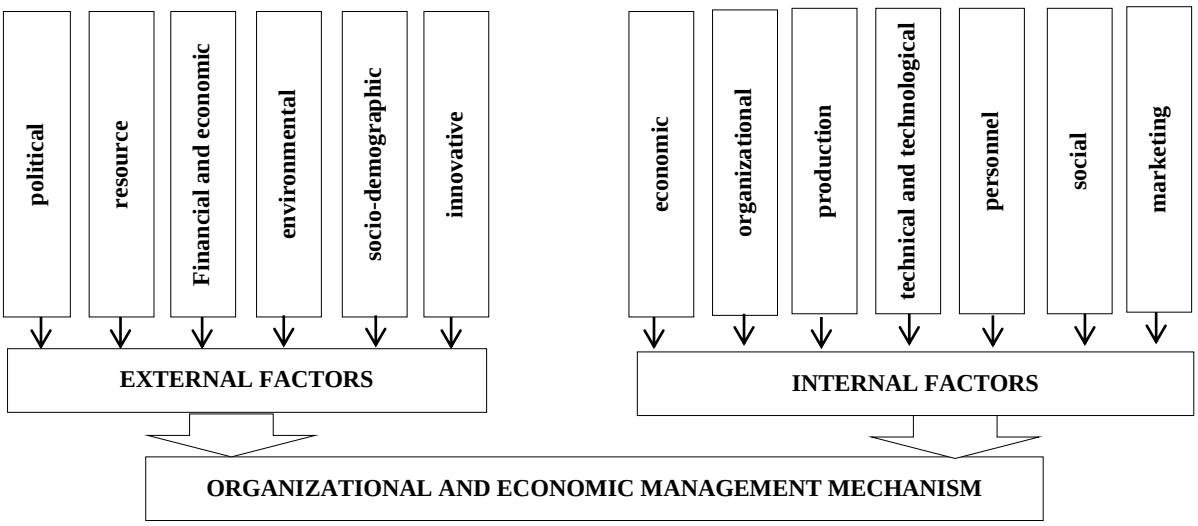


Fig 1. Factors affecting the effectiveness of the organizational and economic management mechanism (source: compiled by the authors)

External factors of influence arise in the environment and do not depend on the activities of a particular enterprise, but affect its functioning. They always require management decisions. External factors are characterized by complexity, mobility and uncertainty [3]. In turn, enterprises do not and cannot influence the external environment, they must adapt to it, observe it, make forecasts and react. To do this, the company needs to constantly make changes to the internal environment, and perhaps even counteract.

Now external factors at the international level have a great influence, which can have a destabilizing orientation. This increases the conditionality of the entire national economy as a

whole from them. When there was an administrative command system and a planned economy, it was believed that the external environment was almost irrelevant for enterprises. Now, in a market economy, this may already threaten the bankruptcy of the enterprise in the near future.

Political factors also play a significant role in the development of enterprises. The inflow of investments coming from foreign countries depends on them, as well as the access of domestic goods to foreign markets. The political stability of the country is determined by the attitude of the state to citizens, to property, to entrepreneurship. The development of Uzbekistan in the socio-economic and socio-political spheres is emphasized by the Action Strategy for the five priority areas of Development of the Republic of Uzbekistan in 2017-2021.

Special attention is paid to the chemical industry. It has a lot of problems and opportunities that are not yet involved. Sh.M.Mirziyoyev set tasks for its modernization, the widespread introduction of scientific achievements and innovations, the introduction of digital technologies, and increasing the level of automation.

Resource factors are considered in the complex of both material and labor, as well as financial resources, which are necessary for the stable operation of the enterprise. When introducing new modern management methods, enterprises must strictly take into account all the resources used and necessary, allowing them to be used profitably with the greatest return. This includes raw materials, materials, equipment and all types of energy.

Socio-demographic factors determine the labor resources of the enterprise. It is necessary to take into account the various qualities that make up the working capacity of the population, such as health, special skills, labor skills, qualifications. All this is especially important for chemical industry enterprises. This also includes social maturity, interests and needs.

Innovation is a factor that has a significant impact on the organizational and economic management mechanism. Scientific and technological progress in the field of "high" technologies, digitalization, computer technology, electronics, communication technologies are fundamentally changing the chemical industry, helping to save material and human resources. Chemical industry enterprises are the main center for the use of high technologies, innovations, and new developments. They have a high knowledge intensity, which is over 3.5% [4]. Such enterprises process a large number of information flows that are transmitted through various communications. Therefore, this factor can also be attributed to the internal management factor that forms the information environment of the enterprise. Further development of the enterprise, its ability to receive information from the external environment, process and analyze it, make prompt and correct decisions directly depends on innovative management factors. On October 5, 2020, the Strategy "Digital Uzbekistan-2030" was approved, which will significantly accelerate the digital transformation of economic sectors in the country.

Each company has its own internal management factors. It depends on them how the company will be able to overcome the crisis, stand up in competition, and ensure economic stability. They include economic, organizational, production, technological, personnel and marketing factors. In fact, it is the goal, task, structure, technology of the enterprise. If the state has a stable economy, then the problems of enterprise development are most likely hidden in internal factors – in the goals of the enterprise and in the ways to achieve them, management methods and organization of activities. Thus, analyzing the expected crisis phenomena and bankruptcy of enterprises in conditions of stable development, it was found out that in two cases out of three, internal factors become the cause of bankruptcy. These are those enterprises whose profits have become less than marginal costs [5].

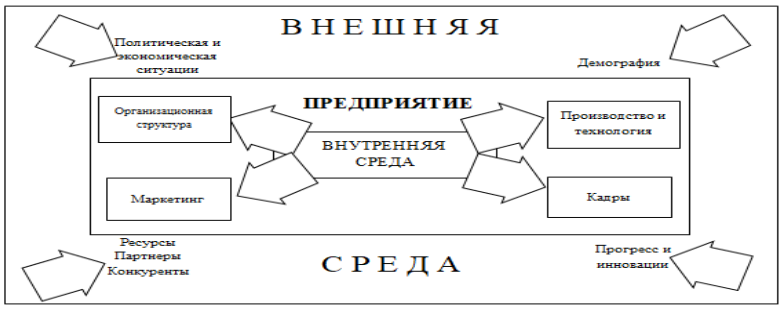


Figure 2 Factors of the external and internal environment of the enterprise

(Source: compiled by the authors)

Internal factors are factors of the internal environment of the enterprise that directly affect the development and functioning of the enterprise (Fig.2).

Production factors (production) – includes equipment and technologies that are used in production, as well as the degree of preparedness of personnel. The quality of the products directly depends on this factor. This is the main internal factor that determines the economic stability of the enterprise.

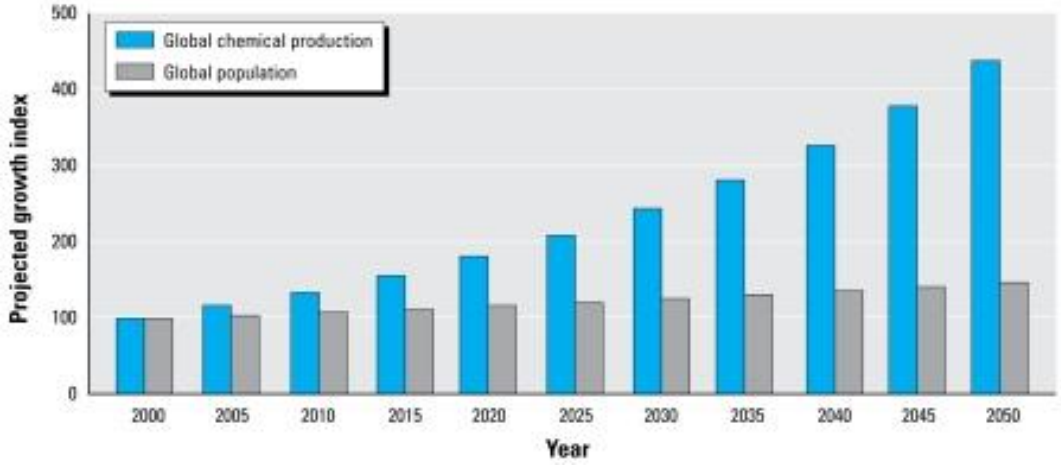
Another important management factor is personnel. The qualification of the personnel, the motivation of their work ensure the sustainable operation of the enterprise, its further development. The global chemical industry is entering an era when human resources are seen as the most important asset.

The chemical industry is an industry with significant costs. It has a high energy intensity, labor intensity and material intensity. Therefore, it is necessary to reduce costs, which is facilitated by a variety of marketing research [6]. Such studies are the main tool for identifying the causes and finding ways to improve. It is necessary to identify the weaknesses of competitors and improve their own advantages. The longer the marketing research period, the more accurate the data and the more reliable the results. It is necessary to comprehensively investigate the level of sales, demand and the factors influencing them. All decisions related to reorganization, the introduction of new technologies must be made on the basis of marketing research

The organizational structure is considered as a system that allows rational use of equipment, enterprise space, personnel.

An effective approach to management in enterprises is not an easy task. To ensure the sustainable development of an enterprise, it is necessary to take into account all factors affecting its development, apply innovative management theories and methodologies [7]. It is necessary to introduce digital transformation, attract experts who can diagnose the activities of the enterprise and all business processes taking place on it, form data arrays, identify bottlenecks, and study priority areas of digital technologies.

According to the forecast, chemical production in the world will grow at a rate of 3% per year, outpacing the growth rate of the world population, which is estimated at 0.77% per year. In accordance with this, chemical production will double by 2024 compared to 2000 (Fig.3)



CONCLUSION

Speaking about the organizational and economic mechanism of management of industrial enterprises, it is necessary to understand that it consists of tightly intertwined elements of an organizational and economic nature. The factors influencing this mechanism are divided into external and internal. The organizational and economic mechanism itself, being an integral system, is influenced by factors of the external and internal environment. He must use and strengthen the effects of favorable factors by developing the enterprise, at the same time counteract and reduce the negative impact of negative factors. A qualitative analysis of the factors affecting the sustainable development of chemical industry enterprises should be taken into account when developing organizational and economic management mechanisms and evaluating the activities of the enterprise.

To solve the problems of the chemical industry, which are associated with the management and optimization of various operations, it is necessary to study the latest achievements in the field of digitalization of the chemical industry, to apply complex tools of ERP, SCM and other control systems. Competent managers should fully understand all the internal critical factors of their enterprise, factors influencing from the outside. It is necessary to choose only those methods and means that correspond to the goals of the enterprise and remember: having been successful in the past, the method may be absolutely ineffective in the future.

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THE EFFECTIVENESS OF LASER ACUPUNCTURE IN ATOPIC BRONCHIAL ASTHMA COMBINED WITH ALLERGIC RHINOSINUSITIS

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ABSTRACT

The diagnosis of the main and concomitant diseases was made on the basis of the results of clinical allergological, functional, laboratory, X-ray studies. The power of forced exhalation was determined by a pneumotachometer, the threshold of sensitivity of the bronchial receptor apparatus to histamine and acetylcholine, the respiratory function of the nose, the number of eosinophil's in peripheral blood and nasal secretions were evaluated, the cause of sensitization of the body was found out [1, 5, 12]. The aim of the work was to evaluate the therapeutic effectiveness of course laser puncture in atopic bronchial asthma combined with allergic rhino sinusitis.

KEYWORDS: *Asthma, Allergy, Clinic, Bronchial Asthma, Neutrophil Activity.*

INTRODUCTION

Bronchial asthma is one of the urgent problems of modern pediatrics [2]. This also applies to the Central Asian region. In Uzbekistan alone, the incidence of bronchial asthma among children has increased 20-fold over the past 5 years [7, 8]. Bronchial asthma has a complex etiology and pathogenesis and is often combined with allergic rhinitis [4,6, The treatment of bronchial asthma continues to be a difficult task. After drug treatment, despite clinical improvement, most patients retain changes in respiratory function, immune status, etc. In this regard, there is a need to find new approaches to the treatment of bronchial asthma. One of the promising directions in the treatment of allergies in general and bronchial asthma, including, is the use of laser radiation. It has been established that it has a multifaceted therapeutic effect — anti-inflammatory reduction of vascular wall permeability, improvement of bronchial patency, microcirculation, increased oxygen content in tissues, stimulation of the body's immune defense [3, 4, 6, 8]90 children aged 7-14 years were under observation, 49 of them boys) 41 girls with atopic bronchial asthma combined with allergic rhino sinusitis were 60 and 30 practically healthy.

THE MAIN PART

The complex of par clinical studies included the assessment of hum oral (IgA, IgM, IgG, IgE) and cellular (T-, B-lymphocytes and their populations) immunity factors [10]. The phagocytic activity of neutrophils was determined by A. Stelzner [13].

For the treatment of patients, they were divided into 2 groups of 30 children each. The 1st group of children on the background of basic treatment received a course laser puncture.

For this purpose, an LG-78 helium-neon laser with a wavelength of 0.63 microns and an irradiation power density of 2 MW/cm2 was used. The exposure time is 10-15 seconds for one corporeal point and 5-10 seconds for one auricular point. The total exposure time is no more than 2 minutes for corporeal points and no more than 20 seconds for auricular points. Treatment was carried out daily. The course of treatment was 5-12 procedures with 2-week breaks. For course laser punctuation, the following corporeal (P7, P8, P10, E36, E41, VB20, V12, RF9, F8, VB41) and auricular (AT12, AT13, AT15, AT22, AT31, ATZZ, AT60, AT78, AT109) points were selected. This mode of course laser puncture is generally accepted in modern clinical practice [9, 10, 12]. The main criterion determining the duration of laser puncture courses, exposure and a set of exposure points was to improve the clinical condition of patients, eliminate or weaken the symptoms of the disease and improve clinical, laboratory, functional and immunological indicators.

The 2nd group of sick children (control) received only basic treatment, which consisted of anti-inflammatory drugs (intel, tailed), bronchodilators (inhaled short-acting β2-agonists), mucolytic, vitamins [1, 2, 6].

The effectiveness of treatment was evaluated by comparing the dynamics of the clinical condition of patients, clinico-allergological, functional and immunological parameters before and after treatment (after 2-4 weeks and, subsequently, after 1-2 years). Treatment was considered excellent when the indicators of functional, radiological, laboratory and immunological studies and the general clinical condition of patients improved (conditionally 5 points); good when the intensity of the painful symptoms of the main and concomitant diseases was significantly weakened and the indicators of most clinical and laboratory studies improved (4 points); satisfactory when the symptoms of the disease persisted, but their intensity partially weakened (3 points); ineffective when the condition of patients remained unchanged (2 points).

Digital data were processed by the method of variation AL statistics with the calculation of the reliability of numerical differences. The differences were considered significant under the condition that $t > 2$ and $p < 0.05$.

Analysis of the results of the obtained data showed that in the majority of sick children (63.3%), the occurrence and development of atopic bronchial asthma began with symptoms of allergic rhinitis and sinusitis. Along with this, in a significant part of children (30.0%), the disease began simultaneously with symptoms of allergic rhino sinusitis and bronchial asthma, and only in a relatively small number of patients (6.7%), the disease began with symptoms of bronchial asthma and after its development, symptoms of allergic inflammation of the nose and its par nasal sinuses appeared.

The cause of sensitization was non-infectious allergens:

1) pollen (20.0%) - wormwood, quinoa, ailanthus, cotton; 2) household and insect (53.3%) — household dust, dermatophagoides microliters; 3) epidermal (26.7%) — cat wool, dog hair. Among the contributing factors, hereditary burden of allergic pathology (75.0%), artificial or previously mixed feeding (65.0%) and allergic diathesis (55.0%) were important. According to the severity of the disease, the children were distributed as follows: mild - 21 (35.0%), average severity - 27 (45.0%), severe - 1-. (20.0%).

The conducted studies have shown the advantages of course laser puncture in comparison with basic treatment (Table 1).

The positive clinical effect of course laser puncture therapy began to be noted during the children's stay in the hospital, and subsequently achieved the best results within 3-4 weeks. The attacks of suffocation stopped completely, the symptoms of respiratory insufficiency and physical changes in the lungs were weakened or eliminated, the indicators of forced exhalation increased and the threshold concentration of biologically active substances increased by 2- 2.5 times. Nasal breathing improved. The percentage of eosinophil's in peripheral blood decreased more than 2 times, as well as the number of eosinophil's in smears - prints of the nasal mucosa. The functional activity of neutrophil phagocytes increased by 1.5-1.7 times.

Before the start of treatment, the color of the nasal mucosa was different — blue-white, pale pink with areas of ischemia. The rhinoscopic picture during remission in most patients was completely normalized or tended to normalize. Prior to treatment, radiography of the par nasal sinuses showed marginal or total darkening of the maxillary sinuses, which disappeared after treatment.

Allergic reactions developing on the basis of immune interactions of allergens with specific antibodies are crucial in the mechanism of development of atopic bronchial asthma. The study of the initial state of some indicators of the immune status revealed the presence of significant :: changes (Table 2). Thus, in sick children, the IdE content was more than 12 times higher than normal. The level of other immunoglobins (IgA, IgM, IgG), in comparison with similar indicators in practically healthy children, was either lower, or higher, or the same. The indicators of the cellular link of the immune system were characterized by a significant decrease in the relative and absolute number of the main populations and subpopulations of lymphocytes ($p<0.05$).

DISCUSSION

Against the background of course laser puncture, there was a significant improvement in the indicators of hum oral and cellular immunity - a decrease in the level of IgE by 1.5 times, an increase in IgG by 1.7 times, IgA by 1.3 times, CD3 by 1.7 times, CD4 by 1.7 times, CD8 by 1.8 times and CD22 by 1.4 times ($p<0.05$). No such changes were observed in children who received only basic treatment. During the next 1-2 years in children who received course laser puncture on the background of basic.

TABLE 1CLINICAL AND LABORATORY INDICATORS IN CHILDREN WITH ATOPIC BRONCHIAL ASTHMA, COMBINED WITH ALLERGIC RHINOSINUITIS, AGAINST THE BACKGROUND OF TREATMENT WITH A COURSE LASER PUNCTURE.

Indicators	Children who received laser puncturing		Children who received basic therapy		Practically healthy children (n=30)
	Before treatment (n=30)	After treatment (n=23)	Before treatment (n=30)	After treatment (n=25)	
Forced exhalation, l/s	1,56±0,45	3,12±0,62 *	1,62±0,54*	2,0±0,70	3,85±0,56

Threshold sensitivity of bronchial receptors to: histamine, mgk% acetylcholine, mcg%	400** 1200**	800* 2600*	400** 1200**	600 2000	1000 3000
Rhinopneumometry Mm of water.st.: Rights Half Lefthand Half	16,8±3,1** 18,4±3,2**	9,5±0,5* 10,4±0,7*	16,4±3,5* 17,3±3,0	8,6±0,6* 8,4±0,7*	8,7±0,3 8,7±0,3
Number of eosinophils, %	10-15**	5-6*	10-15**	7-9	4-5
Phagocytic number of neutrophils, %	44,6±5,1**	66,6±4,4*	45,5±5,3**	55,4±4,4	75,5±4,5
Phagocytic index	3,5±0,4**	6,5±0,7*	3,6±0,4**	6,5±0,6*	7,4±0,5
The power of phagocytosis	156,1±10,3*	432, ±13,3	163,8±10,2*	304,7±12,0	558,7±16,2

Here and in Table 2: $p<0.05$: * when comparing the indicators before and after treatment; ** before treatment in comparison with those of practically healthy children.

TABLE 2IMMUNOLOGICAL PARAMETERS IN CHILDREN WITH ATOPIC BRONCHIAL ASTHMA, COMBINED WITH ALLERGIC RHINO SINUSITIS, AGAINST THE BACKGROUND OF COURSE LASER PUNCTURE THERAPY.

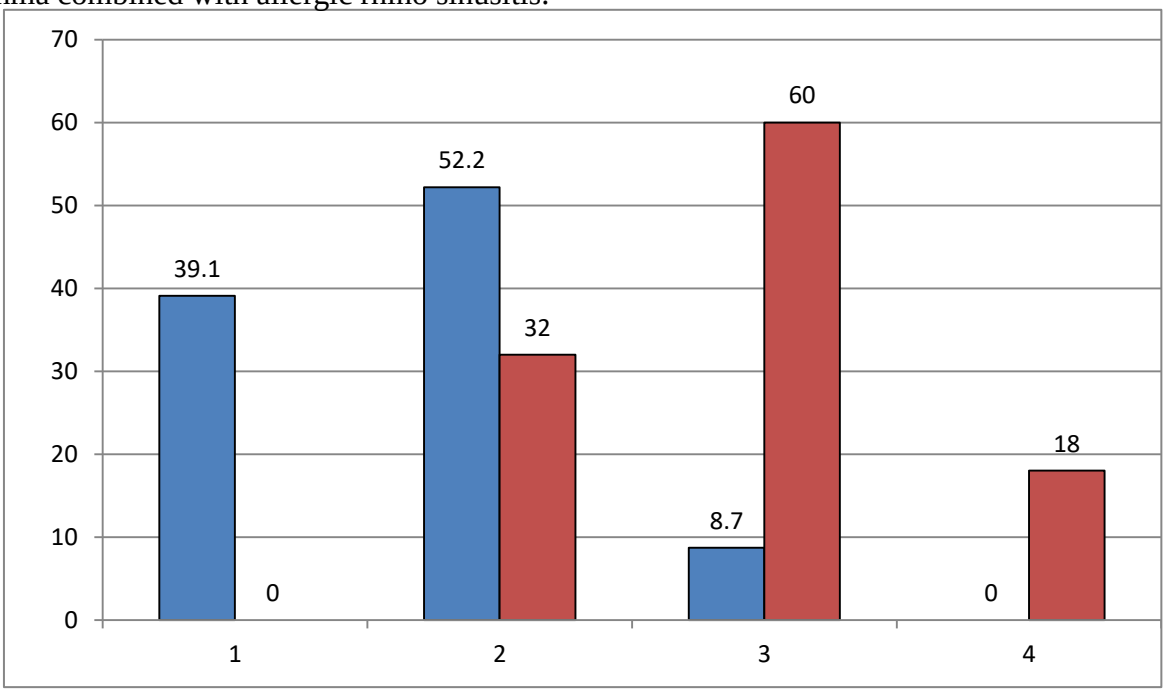
Indicators	Children who received laser puncturing		Children who received basic therapy		Practically healthy children (n=30)
	Before treatment (n=30)	After treatment (n=23)	Before treatment (n=30	After treatment (n=25)	
IgA, g/l	1,10±0,09	1,45±0,10*	1,31±0,08**	1,30±0,11	1,0±0,04
IgM, g/l	1,35±0,12	1,55±0,15	1,33±0,06	1,41±0,13	1,2±0,20
IgG, g/l	10,83±0,71	19,30±0,85*	15,4±0,55**	14,6±0,62*	12,0±0,6
IgE, IU/ML	801,0±59,4**	504,6±66,7*	789,5±49,3**	753,6±49,3**	63,6±9,6
CD, %	51,5±1,4**	58,5±1,2*	54,4±0,7**	55,5±1,2*	62,7±1,1
10^9/л	1,05±0,09**	1,85±0,2*	1,15±0,04**	1,2±0,06*	2,0±0,1
CD4, %	30,7±1,3*	37, ±1,2*	33,2±1,2**	35,6±1,1	38,5±1,6
10^9/л	0,64±0,05**	1,1±0,09*	0,7±0,03**	0,75±0,05*	1,05±0,7
CD8, %	23,5±1,5**	29,3±1,3*	24,4±0,73**	27,8±1,0*	28,6±1,7
10^9/л	0,5±0,05**	0,9±0,09	0,53±0,05**	0,61±0,06	0,7±0,07
CD22,%	20,6±1,1**	26,6±1,2*	23,3±1,0**	24,7±1,0	27,2±1,1
10^9/л	0,55±0,04**	0,78±0,06*	0,58±0,05**	0,67±0,06	0,7±0,08

Therapy, there was an extension of remission periods, and relapses of bronchial obstruction became less frequent. It should be emphasized that the positive therapeutic effect was more often observed in children with mild and moderate course of the disease. In the group of children who received a course of laser puncture on the background of basic therapy, excellent and good results prevailed (on average 4 points), while in patients who received only basic therapy, good and satisfactory results (on average 3 points) prevailed (see figure). The positive therapeutic

effect of course laser puncture is obviously associated with the weakening and, in the future, the elimination of the inflammatory process in the nasal cavity, its par nasal sinuses and lungs, stabilization of the functional state of the immune system, a decrease in the synthesis of IgE.

Fig. Results of laser puncture application in the treatment of children with atopic bronchial asthma combined with allergic rhino sinusitis.

1-



excellent results, 2-good results, 3-satisfactory results, 4-no effect, ■laser puncture, ■ basic treatment.

CONCLUSION

Thus, the course laser puncture performed against the background of basic therapy has a significant positive therapeutic effect in the mild and moderate course of atopic bronchial asthma, combined with allergic rhino sinusitis, in children.

The pathogenesis of the positive therapeutic effect of laser puncture is complex and further research is needed to clarify it. In our opinion, it is impossible to exclude the positive effect of laser puncturing in the form of stimulation of hum oral and cellular links of the immune system, as well as improving the activity of some factors of nonspecific protection of the body and reducing bronchial hyper reactivity.

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COMPUTER VISION AND MACHINE LEARNING FOR IMAGE RECOGNITION: A REVIEW OF THE CONVOLUTIONAL NEURAL NETWORK (CNN) MODEL

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ABSTRACT

Convolutional Neural Networks (CNNs) have recently been utilized in a wide range of applications, including image and pattern identification, voice recognition, biometric embedded vision, food recognition, and video analysis for surveillance, industrial robots, and autonomous vehicles. Convolutional neural networks (CNNs) are gaining popularity for a variety of reasons. Feature extractors are created by hand in classic image recognition models. The weights of the convolutional layer utilized for feature extraction, as well as the fully connected layer, are used for classification in CNNs, and these weights are set throughout the training phase. The goal of this study is to evaluate a few convolutional neural network (CNN) learning machine approaches for image recognition. Furthermore, machine learning algorithms are used extensively in contemporary approaches to picture recognition. This article focuses on the development trend of convolution neural network (CNNs) model owing to various learning methods in image recognition during the 2000s, which is largely introduced from the angles of capturing, verification, and clustering, based on twenty five journals that have been reviewed. As a result, deep convolutional neural networks (DCNNs) have been very effective in a variety of machine learning and computer vision problems because they provide a large quality gain at a low computational cost. This training approach also enables models with many processing layers to learn different degrees of abstraction fordata representation.

KEYWORDS: *Computer Vision, Convolutional Neural Network,Image Recognition, Learning Machine, Neural Network.*

46. INTRODUCTION

Convolutional Neural Networks (CNNs) have shown to be extremely effective in a variety of machine learning and computer vision issues. Convolutional Neural Networks (CNNs) are also utilized in a number of fields such as recognition and robotics. Convolutional neural networks (CNNs) are gaining popularity for a variety of reasons. Meanwhile, during the past several years, convolutional neural networks (CNNs) have been used to recognize objects in the air with tremendous success. It is more organically and easily in terms of capturing a picture from a validity standpoint.

CNNs make assumptions about the image's nature, such as whether it's static or has pixel dependencies. As a result, as compared to traditional feed-forward neural networks with similar-sized layers, CNNs contain many fewer connections and parameters, making them easier to train while theoretically achieving the greatest results.Furthermore, because to their design performance, CNN capacity may be adjusted by altering their depth and breadth.

As a result, CNNs usually have a multilayer stack of basic modules such as a convolutional layer, a pooling layer, and a fully-connected layer. Each module converts the representation at one level into a higher and more abstract level, starting with the raw input. In the meanwhile, greater ordering of dataset representations increases elements of the input that are relevant for discriminating and limits unrelated variations for recognition tasks. Following that, the most recent picture recognition technology is introduced.

Only a year later, the deep learning approach based on convolutional neural networks has produced significant performance improvements in large-scale picture classification tasks, igniting a deep learning boom and establishing deep learning as a new hotspot in the pattern recognition domain. It enables a model with many processing layers to investigate data representation at different levels of abstraction. Furthermore, transfer learning is important in deep learning approaches when someone wishes to train on their own dataset for different reasons, such as when the dataset is insufficient to train the entire neural network, which might cause issues in transfer learning.

Transfer learning may be used to replace the fully-connected layers (and perhaps the final convolutional layer) in a pre-trained Deep Neural Network and train those layers on the relevant dataset. However, it has been discovered that deep neural networks (DNNs) are prone to over fitting when working with tiny data. The methodology of machine learning is crucial in this study to assure the quality and efficiency of images in terms of capture, verification, and clustering that wish to train more effectively, particularly in image recognition, by utilizing the correct learning machines method. The goal of this work is to investigate the many machine learning techniques that must be used in the CNNs mode based on the data and, on occasion, in the state they desire. There have been a lot of useful evaluations on Machine Learning methods, according to the literature. However, there is a lack of research on the distinctions between learning machines that recognize pictures and systems that train data. As a result, this study focuses on picture recognition in terms of capture, verification, and clustering, based on a survey of twenty-five periodicals.

47. DISCUSSION

After reviewing several related papers, conferences, book chapters, and websites, this section will discuss and reveal a superior method or approach for image recognition. Several image recognition systems praised by other writers, however, have certain drawbacks in their proposed methodologies. Convolutional Neural Networks were used to construct and present an overview of picture recognition.Deep Learning Neural Networks are the first technique for training a

dataset. Deep Identification verification features (DeepID2) and Image-Net will be used to train this also shown in Fig.1.

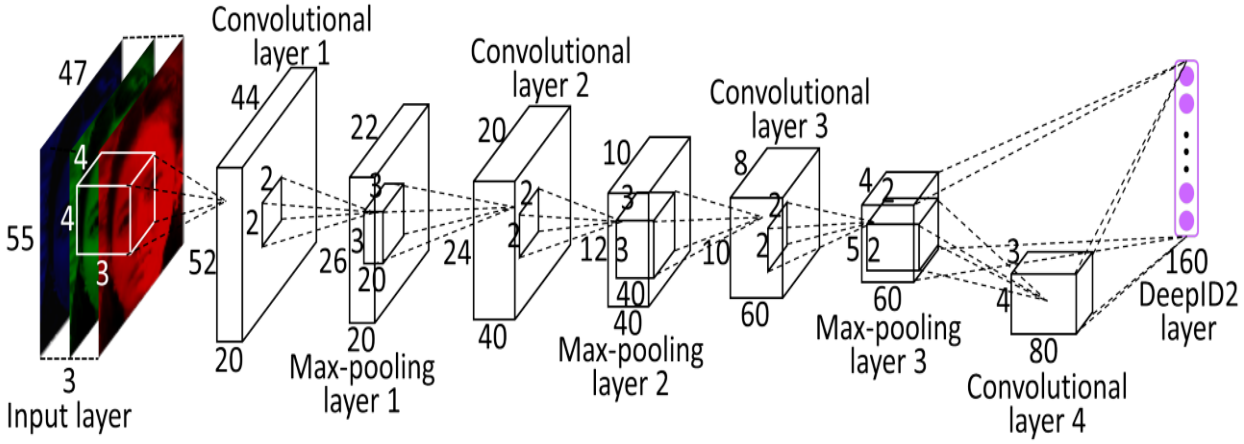

Fig. 1: The ConvNet structure for DeepID2 extraction[1]**.**

The image identification task increases inter-personal variations by drawing DeepID2 extracted from different identities apart, whereas the image verification task reduces intra-personal variations by pulling DeepID2 extracted from the same identity together, where both are required for image recognition.

The influence of image identification and verification supervisory signals on deep feature representation has been demonstrated to correspond with the two elements of creating ideal features, which are: Increasing inter-personal variations, lowering intra-personal variations, and combining the two supervisory signals result in much superior features than each of them alone.

While the second system, Image-Net, is similarly based on deep learning and will be taught to optimize the embedding directly rather than through an intermediate bottleneck layer. This system learns a direct mapping from face pictures to a compact Euclidean space in which distances are directly proportional to a measure of face similarity. Once this space has been created, conventional approaches for picture identification, verification, and clustering may be readily implemented utilizing Face-Net embedding as feature vectors[2]. The better usage of computer resources inside the network is one of the major characteristics of this design. The network's depth and breadth were raised while the computational budget remained unchanged. Picture-Net is a huge image collection with about 15 million annotated high-resolution photos divided into roughly 22,000 categories[3]. Each concept's photos are quality-controlled and annotated by humans.

When compared to shallower and narrower designs, the major advantage of this approach is a considerable quality improvement at a minor increase in computing needs. As define and detail the space of fully convolutional networks, illuminate the application for solid prediction tasks, and connect with previous models that adjust current classification networks into deep convolutional networks and move the learned representation with adjustment to the segmentation task. Then, to create accurate and comprehensive segmentations, build a skip architecture that combines semantic information from a deep and coarse layer with appearance information from superficial, shallow layers.

The second image identification approach is the Double Local Binary Pattern (DLBP), which was developed as part of an integrated automated system with two components: 1) peak expression frame detection and 2) expression feature extraction. In contrast to image-based expression recognition systems, video-based expression recognition systems frequently use online detection and choose low-dimensional feature representation for cost savings. In reality,

because the DLBP approach has a significantly smaller dimensional size and can successfully minimize detection time, it is used to identify the peak expression frame from the video.

This approach is further presented to achieve a more robust face feature for detection by handling illumination changes in the DLBP and Logarithm-Laplace (LL) domains. For the first time, the Taylor expansion theorem is used in the system to extract face expression features and an effective facial feature from the Taylor Feature Map. Face identification, facial analysis, texture classification, and a variety of other applications have all benefited from the usage of DLBP[4].

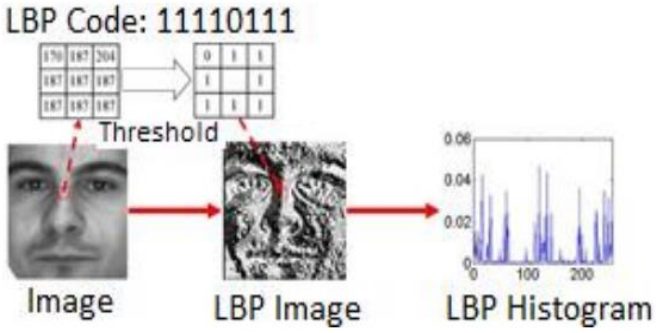

Fig. 2: Illustration of the feature extraction process for LBP[5]**.**

However, when the set comes from distinct datasets with the training data, the identification rate of the DLBP based on feature extraction technique drops dramatically, indicating that the deep learning model is easily over-fitted on the training data. The DLBP method, on the other hand, provides adequate picture identification performance even when the gallery and probe sets are from distinct datasets.Fig. 2: Illustration of the feature extraction process for LBP.

The third approach discussed in this study is Tanenbaum and Freeman's Bilinear Convolutional Neural Networks (BCNNs), which are used to represent two-factor changes in pictures such as “style” and “content” [6]. This method is the most advanced in fine-grained picture identification, but it fails to recognize distinct categories with indirect visual differences. These networks represent the picture as an outer product that is derived from two CNNs' features and captures local feature interactions in a transnationally invariant manner shown in Fig. 3.

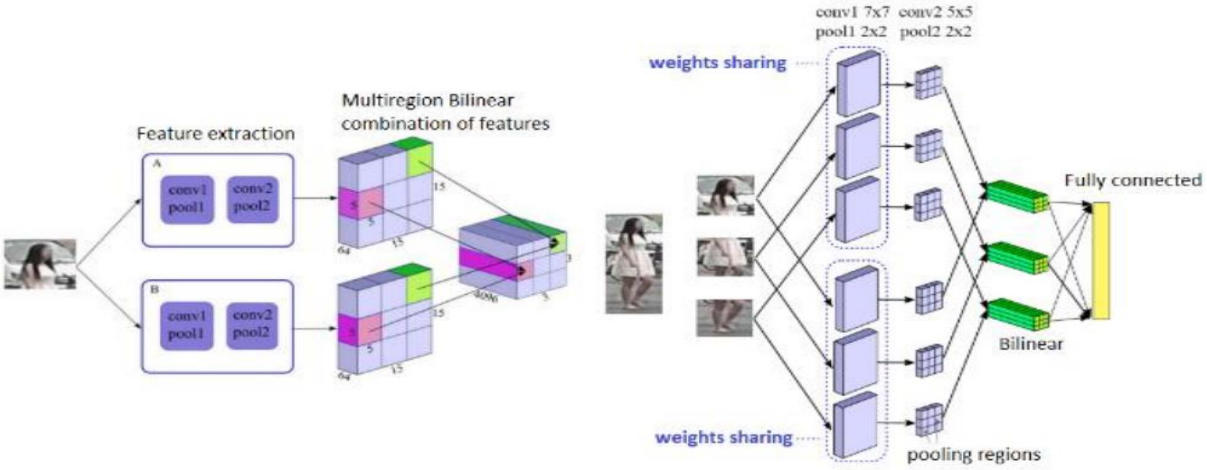

Fig. 3: The proposed architecture for person re-identification[7]

A thorough examination of these networks reveals that the bilinear features are substantially redundant, and that their size may be decreased by an order of magnitude without sacrificing accuracy. Second, it may be used for various image classification tasks including texture and

scene identification, and third, it can be trained from the ground up on the Image-Net dataset, providing constant improvements over the basic architecture.

As a result of the substitution of multiple fully connected layers with a bilinear pooling layer and a linear layer, BCNNs compare well to standard CNN designs in terms of speed. Furthermore, BCNNs are related to order-less texture representations built on deep features, but they can be trained in an end-to-end manner on the most accurate model shows that obtains 84.1 percent, 79.4 percent, 84.5 percent, and 91.3 percent per image accuracy for the Caltech-UCSD birds, NABirds, FGVC aircraft, and Stanford cars datasets, respectively, at 30 frames-per-second on an NVIDIA Titan X GPU [8], [9]. BCNNs have the benefit of using just picture labels and being easily applied to a variety of fine-grained datasets. This method is preferred for detecting images in deep water. BCNN, in particular, provides for the retention of certain spatial information as well as the extraction of more complicated features while increasing the number of parameters above baseline CNNs without over-fitting. There is a noticeable difference between the performance of BCNNs and the performance of regular CNNs.

Liu, Xu, and Chiu performed yet another thorough approach on Multiple Attributes (MA)[10]. Using LBP and PCA for feature extraction and dimension reduction, Euclidean and Manhattan classifiers, and Gabor Filters to extract features, Support Vector Machines, and k-NN classifiers were tested, and using Discrete Cosine Transform (DCT) to extract three feature blocks, as illustrated in Table 1, assist distinguish between males and women by identifying features such as long hair, short hair, with or without tie, skirt, and so on that are placed on the face, upper body, and lower body.

TABLE 1: THE ACCURACY OF EACH PAIR OF ATTRIBUTES

Parts	Attributes Classification	Weighting	Accuracy
Face	female face	0.3	90%
	male face	0.3	
	long hairs	0.2	92.5%
	short hair	0.2	
	no bread	0	87.5%
	bread	0.15	
Upper body	womens clothing	0.1	89.04%
	no womens clothing	0.05	
	no tie	0	85.04%
	tie	0.2	
Lower body	skirt	0.2	85.71%
	no skirt	0.05	
	hot pants	0.2	80%
	no hot pants	0.05	

This finding is in line with Liu, Xu, and Chiu's prior research. They also did a unique study on gender recognition enhancement by assigning weights to each of the distinct characteristics and calculating the male and female scores. Finally, by comparing the scores, the gender identification result is produced. The accuracy of gender recognition will reach a more substantial effect in a new study by Liu and his co-researcher, who used the distribution of attribute weights to get gender scores.

47.1. Comparison of Image Recognition Techniques:

The articles described above explored numerous approaches used in Convolutional Neural Networks to train image recognition learning. Then, in this part, a quick comparison is made between learning machines and traditional image recognition models, which employ precisely handcrafted low level characteristics. The features work well for particular data and tasks, but they require specialist expertise to be successful, and most of them have poor generalization capacity during the training process.

The results and accomplishment statistics demonstrate that CNNs not only beat other detection algorithms, but also outperform humans in situations such as categorizing things into fine-grained categories such as dog breed or bird species. Furthermore, CNNs were used to obtain the highest possible accurate detection rates (CDRs). Using the MNIST database of handwritten digits, CNNs obtained a CDR of 99.77 percent, a CDR of 97.47 percent using the NORB dataset of 3D objects, and a CDR of 97.6 percent on 5600 pictures of more than 10 items. CNNs have been approved as a more commercial use of machine learning methods in computer vision.

As a result, a variety of machine learning techniques exist to train deep learning, particularly in image identification, which requires a thorough knowledge of the picture, such as Alex-Net, VGG net, and GoogLe-Net, as opposed to the two techniques previously stated.

TABLE 2: COMPARISON FOUR TYPES OF MACHINE LEARNING TECHNIQUE

Machine Learning Technique	Advantage	Focused	System
Deep Learning	significant quality gain at a modest increase of computational requirements compared to shallower and narrower architectures	recognition, verification and clustering in image implemented	1)DeepID2 2)Image-Net
DLBP	Detect the peak expression frame from the video due to DLBP technique has a much lower-dimensional size and can successfully reduce detection time	video-based recognition system	Taylor Feature Map
BCNN	Require image labels only and can be easily applied to different fine-grained datasets	fine-grained image recognition	1)Tanenbaum 2) Freeman
Multipleattributes (MA)	Proprietary method of whole-body identification to make the best of multi-attribute (MA) recognition. Besides facial information, it also knows the type of clothing used	face image to make gender identification	1) HOG 2) SVM

Table 2 compares three training machine learning methods for Convolutional Neural Networks that are used to train the data in image recognition. Three factors were employed in the training session: advantage, concentration, and system. Furthermore, by doing extensive study into these approaches, it will be possible to discover an effective characteristic of a range of computer vision jobs. Indeed, certain deep neural networks, because to their deep design and huge learning capacity, come near to human performance on recognition tests. Because it understands the idea of training the data, it helps to eliminate some difficulties while using computer vision.

Furthermore, the emergence of deep learning as feature representations or classifiers has lately benefitted a number of well-established issues in computer vision. DeepID2 and DeepID2+, for example, make use of the concept of joint face identification-verification to decrease intra-personal variances, resulting in a considerable increase in face recognition accuracy[11].

48. CONCLUSION

This article examines a variety of identification, verification, and grouping approaches. The findings demonstrate that deep learning is extremely successful in large datasets. Due to more than twenty publications that have been evaluated, deep learning has succeeded in the system of

Convolutional Neural Networks based on picture implementation. Deep learning gives the greatest performance in image recognition issues and even outperforms humans in some situations. Furthermore, deep learning allows models to be trained directly on full-sized pictures, even when the data used is enormous.

Furthermore, deep learning is advised for use in any environment, including deep surface, such as underwater images, twisting space, and so on. Furthermore, deep learning has a favorable influence on image processing and computer vision, and this benefit is undeniable. Deep learning applications may be developed by doing research and understanding their limitations in order to generate the best results. In conclusion, based on the relevant aspects that have been studied, deep learning is the most successful data training technology ever owing to its ease of use and human-like approach when it comes to picture identification. Deep learning is extensively and primarily utilized for picture recognition, identification, verification, and classification as a consequence of the reading. As a result, this approach is more convenient in terms of comprehending or training data in computer vision picture recognition.

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A REVIEW PAPER ON BLOCKCHAIN

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ABSTRACT

Blockchain technology and distributed ledgers are generating a lot of buzz and sparking a lot of initiatives in many sectors. The financial sector, on the other hand, is regarded as a major user of the blockchain idea. This is owing not only to the fact that the crypto-currency Bitcoin is the most well-known use of this technology, but also to significant process inefficiencies and a huge cost base problem unique to this sector. Furthermore, the financial crisis showed that even in financial services, determining the right current owner of an asset is not always feasible. Retracing ownership over a longer chain of changing buyers in global financial transaction services is even more difficult: when Bear Stearns, a US investment bank, failed in 2008 and was completely acquired by JP Morgan Chase, the number of shares offered to the acquirer was greater than the number of shares outstanding in Bear Stearns' books. The accounting mistakes could not be resolved, and JP Morgan Chase was forced to face the consequences of extra (digital) shares.

KEYWORDS: *Bitcoin, Blockchain, Network, Technology, Transaction.*

1. INTRODUCTION

1.1 Blockchain's Functions and Consequences:

A blockchain is made up of data sets that are made up of a series of data packages (blocks), each of which contains numerous transactions. Each new block adds to the blockchain's length, making it a full record of transaction history. The network can verify blocks using cryptographic methods. A timestamp, the hash value of the previous block (‘‘parent"), and a nonce, which is a random integer for validating the hash, are all included in each block.

This approach guarantees the blockchain's integrity all the way to the first block (the 'genesis block'). Because hash values are unique, fraud can be successfully avoided because modifications to a block in the chain alter the hash value instantly. The block may be added to the chain if the majority of nodes in the network agree through a consensus method on the legitimacy of transactions in a block as well as the validity of the block itself. This consensus mechanism, is the method through which a majority (or, in certain instances, all) of network

validators agree on the state of a ledger. It is a collection of rules and processes that enables many participating nodes to maintain a consistent set of facts"[1]–[3].

Although Bitcoin is the most well-known blockchain application, the technology may be used in a wide range of applications beyond cryptocurrencies. Blockchain may be utilized in different financial services such as digital assets, remittance, and online payment since it enables payments to be completed without the need of a bank or an intermediary. Furthermore, blockchain technology is emerging as one of the most promising technologies for the next generation of internet interaction systems, such as smart contracts, public services, internet of things (IoT), reputation systems, and security services.

Despite the fact that blockchain technology offers enormous promise for the development of future internet services, it is beset by technical difficulties. To begin with, scalability is a major issue. The size of a Bitcoin block is currently restricted to 1MB, and a new block is mined every 10 minutes. As a result, the Bitcoin network is limited to 7 transactions per second, rendering it unsuitable for high-frequency trading. Larger blocks, on the other hand, need more storage space and take longer to propagate across the network. As people want to maintain such a huge blockchain, this will eventually lead to centralization. As a result, finding a balance between block size and security has become difficult. Second, it has been shown that miners may earn more than their fair share of income by using a selfish mining technique. Miners conceal their mined blocks in the hopes of making more money in the future. As a result, branches may occur often, impeding blockchain growth. As a result, some remedies to this issue must be proposed. Furthermore, even when individuals solely utilize their public and private keys to conduct transactions, privacy leakage may occur in blockchain. It's even possible to trace a user's actual IP address. Additionally, existing consensus methods like as proof of work (PoW) and proof of stake (PoS) have significant flaws. PoW, for example, consumes a lot of power, and the phenomena of the wealthy becoming wealthier may show up in the PoS consensus process. These issues must be solved in the development of blockchain technology[4]–[6].

As a result, new transactions are not added to the ledger automatically. Instead, the consensus process guarantees that these transactions are held in a block for a certain amount of time (for example, 10 minutes in the Bitcoin blockchain) before being transmitted to the ledger. The information on the blockchain can no longer be altered after that. Blocks are produced by so-called miners, who are paid with Bitcoins for verifying the blocks in the case of Bitcoin. The example of Bitcoin demonstrates that the blockchain concept is capable of altering more than only the process of money transfers. People all around the globe may trust each other and transfer various types of assets peer-to-peer via the internet using encryption.

The above-mentioned distributed ledger system has many advantages. In contrast to centralized systems, the network's functions continue even if individual nodes fail. People do not have to evaluate the trustworthiness of the intermediary or other network members, which promotes trust. It is enough for people to develop confidence in the system as a whole. Data security is also enhanced by the lack of middlemen. The present practice of third parties acquiring personal data, entails the danger of security breaches[7]–[9].

Third parties may be rendered obsolete by using the blockchain, thus improving user security. Various articles on blockchains have been published in recent years in computer science, and they have, for example, examined consensus methods or suggested new ideas to address problems with smart contract privacy. However, academic papers in information systems surrounding blockchain presently mainly concentrate on cryptocurrencies, despite the fact that there are many industry whitepapers on blockchains. Figure 1 shows the example of a blockchain.

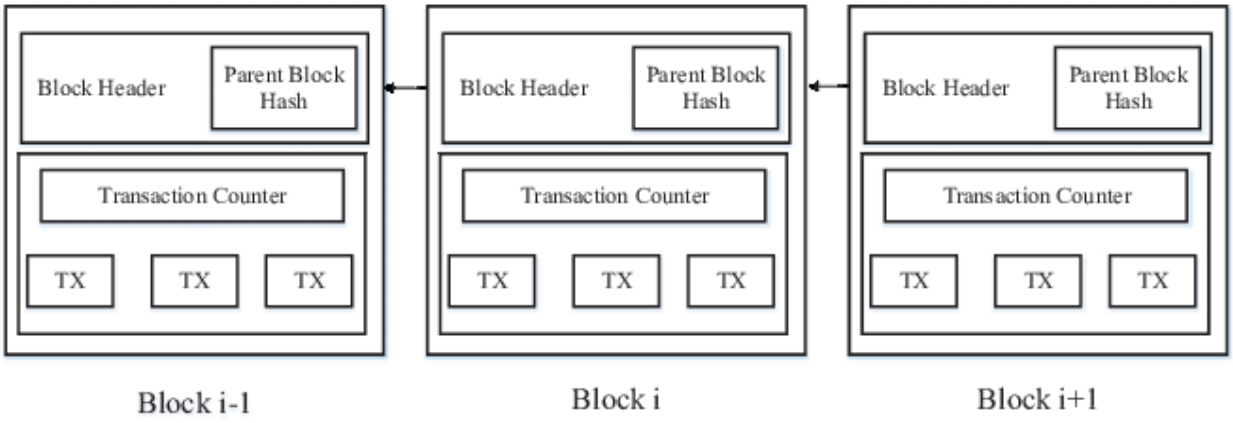

Figure 1: The above figure shows the example of a Blockchain.

There are disadvantages and possible dangers, which are addressed in this stream of research, in addition to substantial benefits. a number of Bitcoin flaws, including Bitcoin theft or loss (malware assaults, unintentional loss), scalability difficulties (delayed transaction confirmation, data retention, and communication failures), and structural issues (deflationary spiral), on the other hand, provide ideas for enhancing the current Bitcoin technology. For example, a "fair exchange protocol" may help users maintain their anonymity. Other writers have addressed the privacy concerns of Bitcoin. Privacy can only be preserved in the present Bitcoin environment by utilizing pseudonyms. As a complement to Bitcoin, this allows for fully anonymous cryptocurrency transactions. The successor to Zerocoin, Zcash, was released in 2016.

If new blocks are added to the network at a rapid pace, the process of creating new blocks may cause performance issues. To improve transaction speed ‘‘Inclusive Block Chain Protocols" as an alternative to the current blockchain topology. It will be fascinating to see if this new technology can solve performance issues[10].

1.1 Smart Contracts and Blockchain:

The development of blockchain technology in recent years has also bolstered other theories proposed in the literature. Szabo coined the phrase "Smart Contracts," which integrate computer protocols with human interfaces to carry out contract requirements. Smart Contracts are becoming more popular as a result of the blockchain since they can be used more readily with blockchains than with the technology available at the time of their creation 20 years ago. This novel method might, for example, eliminate the need for attorneys and banks to participate in asset-purchase contracts based on predetermined criteria. Smart Contracts may also be used to manage property ownership. These assets may be physical (e.g., homes, cars) or intangible (e.g., intellectual property) (e.g., shares, access rights). Ethereum, a decentralized system suggested by Buterin, is a notable example of blockchain technology that regards smart contracts as first-class citizens. Glaser and Bezzenberger offer a taxonomy of decentralised consensus systems as well as an overview of various kinds of systems. Ethereum is a blockchain that extends the Bitcoin blockchain to enable a wider range of applications. As a result, blockchain technology enables the use of cryptography to create contracts and to eliminate the need for third parties (such as a notary) to build confidence in the past. By automatically executing contracts in a cost-effective, transparent, and secure way, blockchain has the potential to disrupt the whole transaction process. Glaser proposes a paradigm for implication analysis of blockchain systems for digital ecosystems, as well as the architectural components of blockchain technology and their interactions.

The banking sector is even considering whether the blockchain will be able to replace significant portions of their present operations. The payment procedure is a good example of this. When

individuals pay for items with a credit card nowadays, the settlement takes several days. This delayed settlement would become a thing of the past if the blockchain was used.

1.2 Blockchain Applications and Future Trends:

1.2.1 Applications:

The differentiate between financial and non-financial applications that the blockchain may possibly solve. This disruptive invention has the potential to alter not just the nature of financial relationships, but also many other aspects of our daily lives. a British musician, sells her tracks on the blockchain, for example.

1.2.2 Future Trends:

Blockchains seem to have a wide range of applications, particularly in sectors that have traditionally depended on third parties.

It is necessary for both sides to develop a level of confidence. Atzori is a Greek word that means "to be indicates that politics and society as a whole may be in trouble. The blockchain has rebuilt the system. Many functions may be affected. If individuals began to organize and defend themselves, they would become obsolete. Decentralized platforms are being used by society. Finally, the author said that ‘‘government service decentralization via Permission blockchains are both feasible and desired. Can substantially improve the efficiency of government administration". The significance of reorganizing societies cannot be overstated. Countries that are impoverished. It is possible to better safeguard one's wealth making use of the blockchainparticularly in the developing world, when it comes to proving ownership, landowners have challenges. The municipal authority, for example, wants to expropriate the population. These existential dangers are manageable. Land titles are being integrated onto the blockchain. However, as you can see, As Glaser) points out, the interaction between the It's possible that the digital and physical worlds will collide. The weak link that jeopardizes the established digital trust a blockchain-based system there is also a discussion going on right now among scholars and academics. If crypto-currencies based on the blockchain are regulated, can do real-money tasks (European Central Bank) Money. Mishkin defines it as "something that isn't usually recognized as a form of payment for products or services or as a kind of currency the settling of debts" According to Luther and White, that crypto-currencies are very seldom utilized as a medium of exchange today a means of exchange provide empirical evidence. Bitcoin is mainly utilized as a currency, according to these findings. This is a speculative asset. Spending and accepting, on the other hand, may be difficult. Because to entrepreneurs' creative methods, things have become a lot simpler. Establishing crypto-currencies as a fiat currency replacement money. As a result, the blockchain may help. In the real world, alter the way people pay for products. When purchasing a home, homeowners must pay a lot of money. Property. ‘‘Blockchain," according to Goldman Sachs. May lower title insurance rates and earn $2–$3 billion in revenue Reduced mistakes resulted in a $4 billion cost reduction in the United States. Effort made by hand". While computer scientists are primarily concerned with technological issues, in this field, as well as cryptographic difficulties, researchers engineering for Business and Information Systems field will be able to concentrate on market design. Issues of trust and privacy, as well as their adoption the failure to embrace modern technologies Furthermore, this obstructive. Many established businesses may be affected by innovation. Models, as well as build new ones, which may have serious consequences. Affecting whole industries as a result, study at the crossroads is necessary. Technology, markets, and business models are unquestionably intertwined valuable.

2. DISCUSSION

The blockchain has been mentioned by the author. Blockchain may be utilized in a number of financial services, including digital assets, transfer, and online payment, since it enables

payments to be conducted without the need of a bank or an intermediary. In addition, blockchain technology is rapidly gaining momentum as one of the most efficient ways for the next generation of computer functions, such as smart contracts, public services, and the internet of things (IoT), reputation systems, and security services.

Despite the fact that blockchain technology has great potential for the future of internet services, it is beset by technical problems. For starters, scalability is a major issue. For the time being, a Bitcoin block can only be 1MB in size, and new blocks are mined every 10 minutes. As a result, Bitcoin's network can only handle 7 cycles per second, limiting high-frequency trading options. Larger blocks, on the other hand, need more storage space and propagation time across the network. People will want to maintain such a huge blockchain in the end, resulting in centralization. As a result, finding the appropriate mix of network capacity and security has become difficult. Second, it has been shown that individuals may earn more than their fair share of income by using a selfish mining technique. Miners hide mined blocks in the hopes of earning more money in the future.

3. CONCLUSION

When it comes to the blockchain, the author has come to a conclusion. The blockchain is highly respected and accepted due to its decentralized design and peer-to-peer nature. Bitcoin, on the other hand, safeguards a significant amount of blockchain research. Other than Bitcoin, though, blockchain may be utilized in a variety of applications. Blockchain has shown its capacity to disrupt traditional sectors because to its basic characteristics of decentralization, persistency, anonymity, and auditability. This article provides a comprehensive overview of the blockchain. We begin by giving a general introduction of blockchain technology, including its architecture and key characteristics. We'll next go through some of the most popular blockchain consensus algorithms.

In a number of methods, the author examines and evaluates these processes. We also take a look at some of the most popular blockchain uses. We also go through some of the challenges and problems that may impede blockchain development, as well as some of the existing solutions. There are also some suggestions for future paths. Smart contracts are quickly developing these days, with a variety of smart contract applications being proposed. However, owing to the many faults and limits of smart contract languages, many innovative applications are still impossible to implement. In the future, we'd want to do a comprehensive investigation into smart contracts.

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A REVIEW PAPER ON CHARACTERISTICS OF BLOCKCHAIN

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ABSTRACT

Blockchain is being hailed as a technical breakthrough that has the potential to transform the way society trades and communicates. This reputation stems from its ability to enable mutually distrusting entities to exchange financial value and communicate without the need for a trusted third party. Furthermore, a blockchain enables for the preservation of data with integrity and the transparency of processes. In this article, we examine whether or not a blockchain is the best technological solution for a certain application situation. We compare the characteristics of permissionless (such as Bitcoin/Ethereum) and permissioned (such as Hyperledger/Corda) blockchains to those of a centrally controlled database. We provide a systematic approach for determining the best technological solution for a given application issue. We examine three use cases in detail, namely Supply Chain Management, Interbank and International Payments, and Decentralized Autonomous Organizations, using our approach, and end the paper with a forecast for future possibilities.

KEYWORDS:*Bitcoin, Blockchain, Data, Organization, Technology.*

1. INTRODUCTION

Bitcoin and its blockchain have made it possible for mutually distrusting organizations to conduct financial transactions without depending on a central trusted third party, while also providing transparent and integrity-protected data storage. Blockchain as a technology has gotten a lot of interest because of these characteristics, which include distributed cloud storage, smart property, the Internet of Things, supply chain management, healthcare, ownership and royalty distribution, and decentralized autonomous organizations, to mention a few. The above figure explains about blockchain[1]–[3].

In contrast to Bitcoin's permissionlessblockchain, which allows any writer or reader to join at any time, permissioned blockchains have been suggested, which enable only a limited number of organizations to write and read the blockchain. However, since a permissioned blockchain resembles a centralized database, the issue of whether a blockchain is better suited than a centralized database arises.

In this paper, we compare and contrast the characteristics of various blockchain kinds (permissioned and permissionless) with those of a centrally maintained database. We provide a technique for determining if a blockchain is suitable for a given issue based on the criteria, and if so, the kind of blockchain to employ.

We examine three use cases in depth, namely

- Supply chain management
- Interbank and international payments.
- Decentralized autonomous organizations, using our approach to determine if and which blockchain type makes sense for the particular applications.

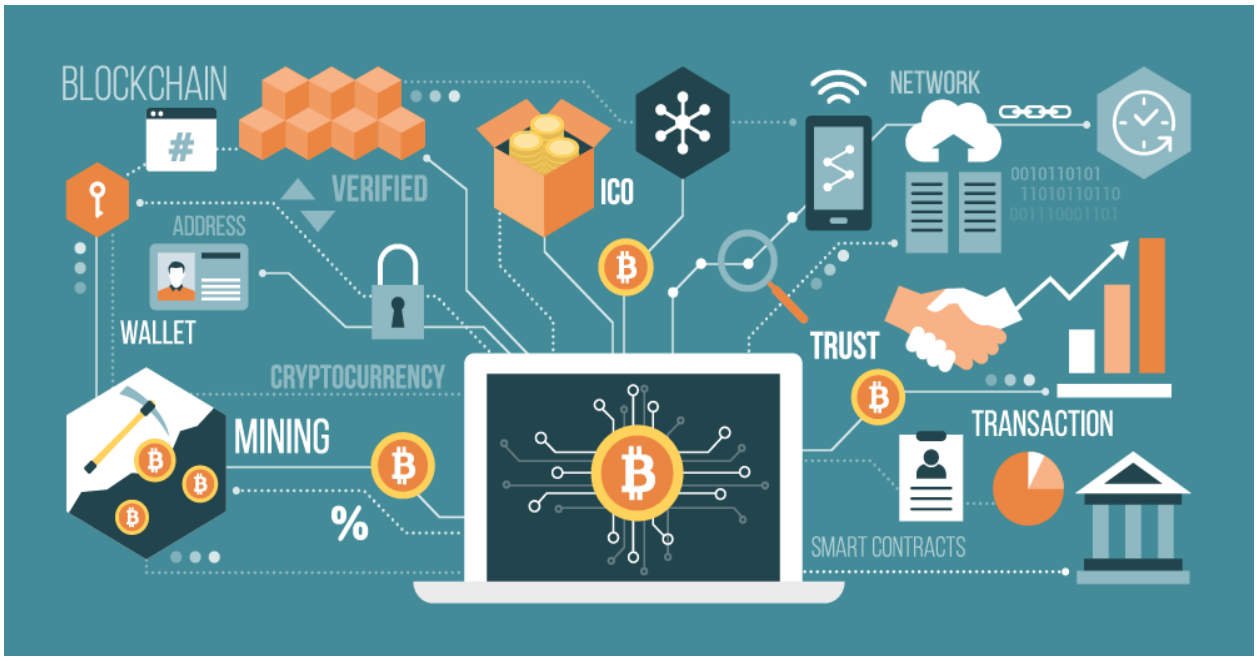

Figure 1: The above figure explains about blockchain [trentonsystems].

The following is how the rest of the article is structured. The most essential background of blockchain is briefly described in Section II. We offer a systematic approach in Section III for determining if a blockchain makes sense and, if so, whatever kind of blockchain would be suitable. In Section IV, we examine suggested use cases in depth using our approach. We examine relevant work in the field in Section V, and we wrap up the paper in Section VI.

1.1 Blockchain Introduction:

The necessary blockchain background as well as the parties involved are detailed in the next section. The term blockchain comes from the technological structure of the system, which is a chain of blocks. A cryptographic hash links each block to the one before it. A block is a data structure that enables a list of transactions to be stored. Peers in the blockchain network originate and trade transactions, which alter the state of the blockchain. As a result, transactions may exchange monetary quantities, but they are not limited to financial transactions alone, allowing for the execution of arbitrary code inside so-called smart contracts[4], [5].

Before we get into the particular distinctions between permissionless and permissioned blockchains, let's take a look at who makes up these networks. Any entity that publishes state to the database is referred to as a writer in any database system. This corresponds to a blockchain participant who participates in the consensus process and contributes to the blockchain's growth. As a result, a writer may collect transactions in a block and add that block to the blockchain. A writer's work may also qualify him or her as a validator. A reader is defined as any entity that is

not expanding the blockchain but is instead engaging in the transaction generation process, reading and analyzing the blockchain, or auditing the blockchain. Regulators and blockchain software maintainers are considered outside of this scope.

Blockchains with No Permissions Permissionlessblockchains, such as Bitcoin and Ethereum, are open and decentralized. Any peer may join and exit the network at any moment as a reader or writer. Surprisingly, there is no centralized body in charge of membership management or the ability to prohibit unauthorized users or authors. This openness means that any peer may read the published material. However, using cryptographic primitives, it is theoretically possible to create a permissionlessblockchain that conceals privacy-sensitive data[6]–[9].

Blockchains with Permissions Permissioned blockchains have recently been suggested as a way to only authorize a small number of users and authors. Individual peers are granted the ability to participate in the blockchain's write and read activities by a central organization.

Readers and writers may operate on different parallel blockchains that are linked to offer encapsulation and privacy. Hyperledger Fabric and R3 Corda are two of the most well-known permissioned blockchains.

1.2 Characteristics:

The most important features of distributed ledgers and centralized systems are described and compared in the following sections.

1.2.1 Public Verifiability:

Anyone may check the accuracy of the system's state using public verifiability. Each state change in a distributed ledger is verified by verifiers (for example, miners in Bitcoin), who may be a small group of people. Any observer, on the other hand, may verify that the ledger's state was updated in accordance with the protocol, and all observers will ultimately have the same view of the ledger, at least for a given period of time. Different observers in a centralized system may have completely different perspectives on the state. As a result, they may be unable to verify that all state changes were carried out properly[10].

1.2.2 Transparency:

Rather, observers must trust the central organization to supply them with accurate information. For public verifiability, the data and the process of changing the state must be transparent. However, the quantity of information that is visible to an observer may vary, and not every participant need access to every piece of data. Any system's ability to maintain privacy is critical. Between privacy and openness, there is a natural conflict.

1.2.3 Privacy:

Because transparency and public verifiability are not needed for the system to operate, privacy is definitely simpler to establish in a centralized system.

1.2.4 Integrity:

Information integrity guarantees that data is secured from unwanted changes and that the data obtained is accurate. Information integrity is inextricably related to public verifiability. Anyone may verify the integrity of data if a system offers public verifiability; otherwise, integrity can only be guaranteed if the centralized system is not corrupted.

1.2.5 Redundancy:

For many applications, data redundancy is critical. Replication across the authors provides redundancy in blockchain systems by default. Redundancy in centralized systems is often accomplished via replication on several physical servers and backups. Trust Anchor identifies

the person who represents the system's highest authority and has the ability to grant and revoke read and write access.

1.3 Conflicts of Transparency and Privacy:

Between openness and privacy, there is an inherent compromise. Anyone may view any piece of information in a completely transparent system, thus there is no privacy. A completely private system, on the other hand, offers no transparency. However, despite making the process of state transitions visible, a system may still offer substantial privacy guarantees, for example, a distributed ledger can give public verifiability of its overall state without revealing information about the state of any individual participant. Cryptographic methods may be used to provide privacy in a public system, but they usually come at the expense of efficiency. For example, the cryptocurrency Zerocash uses computationally costly encryption to guarantee complete anonymity while yet allowing public verification of the ledger state.

1.4 Where Does A Blockchain Make Sense?

Using an open or permissioned blockchain makes sense only when many mutually distrusting entities wish to interact and alter the status of a system without agreeing on an online trustworthy third party.

There is no need for a database if no data needs to be kept, therefore a blockchain as a database is useless. Similarly, if there is just one writer, a blockchain offers no extra assurances, and a traditional database is better suited since it delivers superior throughput and latency. There are two possibilities if a trusted third party (TTP) is available. First, if the TTP is always online, it may be delegated write operations and act as a validator for state transitions. Second, since the TTP is typically offline, it may act as a certificate authority in a permissioned blockchain, which means that all of the system's authors are known.

A database with shared write access is likely the best option if the authors all have mutual confidence in one another, i.e. they believe no one is malevolent. Using a permissioned blockchain makes sense if they don't trust each other. Depending on whether public verifiability is needed, anybody (public permissioned blockchain) or a limited group of readers (private permissioned blockchain) may read the state. A permissionlessblockchain is an appropriate option if the set of authors is not fixed and known to the participants, as it is for many cryptocurrencies such as Bitcoin.

2. DISCUSSION

A block is a data structure that enables a list of transactions to be stored. Peers in the blockchain network originate and trade transactions, which alter the state of the blockchain. As a result, transactions may exchange monetary quantities, but they are not limited to financial transactions alone, allowing for the execution of arbitrary code inside so-called smart contracts, for example. Before we get into the particular distinctions between permissionless and permissioned blockchains, let's take a look at who makes up these networks. Any entity that publishes state to the database is referred to as a writer in any database system. This corresponds to a blockchain participant who participates in the consensus process and contributes to the blockchain's growth. As a result, a writer may collect transactions in a block and add that block to the blockchain. A writer's work may also qualify him or her as a validator. A reader is defined as any entity that is not expanding the blockchain but is instead engaging in the transaction generation process, reading and analyzing the blockchain, or auditing the blockchain. Regulators and blockchain software maintainers are considered outside of this scope.

3. CONCLUSION

The author concluded about the blockchain, it's not easy to decide between a centralized database and a permissionless or permissioned blockchain. While this topic has been addressed before [29], we believe our paper is the first to provide a systematic approach for determining which technical solution is the greatest fit for whatever application situation. The necessary trust assumptions, application needs, involved parties, and technological features like as throughput and latency are all taken into consideration by our approach. This is due to its capacity to allow mutually distrusting entities to exchange financial value and communicate without the need of a trusted third party. Furthermore, a blockchain allows for the integrity of data to be preserved as well as the transparency of procedures. In this post, we look at whether a blockchain is the appropriate technical solution for a certain use case. The features of permissionless (Bitcoin/Ethereum) and permissioned (Hyperledger/Corda) blockchains are compared to those of a centrally managed database. We provide a method for finding the optimum technical solution for a certain application problem. We tested our approach on three well-known application scenarios that have sparked increased interest in blockchain technology, as well as additional use cases. We conclude that, depending on the application situation, each, permissionless and permissioned blockchains, and centralized databases have legitimate use cases that must be carefully evaluated.

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GENEROSITY ISSUES OFNIZAMI GANJAVI AND ALISHER NAVOI'S WORK

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ABSTRACT

In this article, NizamiGanjavi and AlisherNavoi's comments on generosity are interpreted in the form of epics.Movorounnahr in the blessed city of Mecca, when he went to Hajj, he borrowed money in the amount of fifteen thousand [But from there] upon his return, when he reached Halap, he canceled his plan to travel to merchant Movorounnahr, and if you return the money you had received from me before, then you would have gone back to your homeland after that, would not have allowed khodjazoda to return to his homeland either.

KEYWORDS: *Epic, Generosity, Comparative Analysis, Righteous Generosity, Statehood, Divine Character, Perfection.*

INTRODUCTION

AlisherNavoi's works have promoted many universal values of excellence: fairness, honesty, honesty, generosity, honesty, kindness, kindness, goodness, tolerance. These qualities not only make a person glorious, virtuous and believing, but also bring him closer to God, incline to divine qualities, says the great thinker [23,12]. After all, the meaning of the life of khazratNavoi was also closely related to generosity. In the work “Makorimul-akhloq”, which gives detailed information about the life and activities of the poet, there is such a story: “one time when one of the children of Khoja NasiruddinUbaydullah, a companion of the people, intends to travel to Movorounnahr in the blessed city of Mecca, when he went to Hajj, he borrowed money in the amount of fifteen thousand [But from there] upon his return, when he reached Halap, he canceled his plan to travel to merchant Movorounnahr, and if you return the money you had received from me before, then you would have gone back to your homeland after that, would not have allowed khodjazoda to return to his homeland either. Khodjazoda forcibly he stayed in the land and sent one of his people to Samarkand to collect that money and bring it to Halap. When this man, sent by him, arrived in the city of Herat, the charisman, took part in the blessed assembly of ulkhazrat (AlisherNavoi), who was the base of the world's great powers and the refuge of the pink, and spoke of the reason for which he stood in the city of Halap, khodjazoda. Then the lord said, "this money in insignificant quantities is not worth it to go to Movorounnahr and collect it and wait for your master [in Halap] so long" they said, and they sent him to Halap, handing that money over to one faithful man from their side. As a result, khodjazoda was relieved of captivity and went to his native country” [15,114]. This is just a drop from the sea of Navoi.

First of all, if we look for an answer to the question of what can be done, then the word "generosity" is described in the dictionary of Navoi's works as follows: “Generosity – sakho, generosity, openness with hands, nobility, and generosity.

MaydonisaxoichrajalodatKO‘rguz,

Topqanniberuramrig‘anodatko‘rguz. (“Xazoyinul-maoniy” Ia 470)

In the Explanatory Dictionary of the five-part Uzbek language: generosity – openness, nobility, generosity, high generosity, generosity. (III vol) given information. In NajmiddinKomilov's book "Khizrchashmasi“ it is said that generosity is synonymous with the concepts of ”karam“, ”futuvvat“, ”himmat" [23,15]. Karam, that is, generosity from the attributes of Allah, therefore, it is good to be karam, to please people with different tortures, it is the honor of these people. But, Navoi says, if it exceeds its limit, it is wasteful. Continue these thoughts in the work of the "Mahbubulqulub", 11-remark of his work shows the inequality of karam by putting generous and indifferent people against it, and at the same time by saying that it will be the norm in every case, it is also wasteful to spend excess:

“Isrofsaxoemasvaitfolnima’noahlisaxodemas. Haqmolinkuydurgannidevonaderlarvayorug‘ kundasham’ikofuriyyoqqonniaqldinbegonaderlar. Munohotuchunbermakxudnamoliqvaaningbilao‘zinsaxiydemakbehayoliq. Ulki el KO‘rmagunchabermas – laimdir, saxiyemas. Tilabberganni ham saxodinyiroqbil; ibrombilabergandinbermaganniyaxshiroqbil. Birtao‘tmakniikkibo‘lub, yarminbirochg‘abergannisaxiy de; o‘ziyemaybarinmuhtojgaberganniaxiy de” [16,108]. Hence, generosity must be done to the person in need in his place. As Navoi said, given at the right time is a buz coup, and the dice chopon, which is a nonsense gift, is naughty. As such, generosity is generous not only with material things, but also to build madrasahs, mosques, to beautify the ruined places.

Special emphasis is placed on the issue of ”SaddiIskandari” epic. In the XLV chapter of the epic, the story about generosity and forgiveness is quoted.

In Adam region was a merchant in the province, and he was the most skillful of merchants. As a son, he was very intelligent. The merchant was always busy with trade, and every ten days he traveled from the city to this city. Leaving one night's sleep and going to many trades, robbers attack the caravan before it has yet to cross any steppe and river. From the sweetness of the soul, everyone will escape on all sides. In the same conflict, the merchant saved his soul, but separated from his son. This grief makes it complete but:

Bu g‘amdinjigarnitopibyoraliq,

Dedi: “Menmenemdiyuovoraliq.

Quyundekyuzurg‘umdururhartaraf,

Bu xokiybadanbo‘lg‘uchabartaraf.

Murodimharimig‘aqo‘ysamqadam,

Biyobondasargashtalikdin ne g‘am” [8,253]

He had a thousand gold coins hidden in his waist, he would see the fund standing in his waist and look for his brown. Ran incessantly and reached a wonderful man. How many steppe conquerors poor this city is also accelerates his step to search. Behold, in one place, few people are gathering. And in their hands there is a captive. But his whole body is painted with his own blood, again playing the sword of the wicked on top. This is a sucking, which causes blood slander to such a kind of grip. To get rid of this revenge, they put a thousand-dollar price on him, but there is no one who can afford this suction. When the exhausted merchant saw this situation,

he took the cash that he tied to his chest, giving it a thousand gold, and he saved the captive of the lioness. Then looks at it's his liver-child. His joy was endless. Then asked the merchant's son how he got into such a situation. Son: “that day I got caught by the bandits me. Previously, they all wanted to kill me. And then, having sworn to take my head, they made me a condition, saying” let us not kill you, but now you make friends with us, and become our confidant in whatever we do. ”After such a promise of gift, before death, poor was convinced of their condition. And today they came to this kishvar and they fought with the whole people. In the same conflict, a man from the people became a martyr, I was enslaved to the people by the robbers. After submitting this case to the governor, by his decree, I was handed over to the heirs of the one whose aunt was killed by the robbers for the sake of diet. The sun of my life is full you have come” When the people are aware of the situation, it is also necessary to inform the king:

Ulus voqifo‘lg‘ochbuahvoldin,

Xabarberdilarshahg‘aulholdin.

Chu voqifbo‘lubulnavohishahi,

Karamnuktasiningbo‘lubogahi.

Yano qilditojirnipiroyaliq,

Burundinfuzunnaqdusarmoyaliq.

Ming oltungakimzohirettikaram,

O‘g‘ultoptiyuyuzmingiqbol ham [8,254].

At a time when the merchant himself needed gold, he saved a poor man from death, generosity brought him to a high rank was formed, and he reached the land of his own liver.

"SaddiIskandari" epic just like in ”Iqbolnoma" Iskandar and the chronicles of the doctors are cited, each judge puts forward his thoughts on the state administration and advises Alexander. In particular, Hurmus raises generosity high in public administration. And the king knew that he should be generous in order to achieve the love of the people.:

Ki: «Shahg‘asaxovaterurnoguzir,
Bo‘lurg‘aishixalqarodilpazir.

But not every expenditure made with bragging rights goes into generosity. For example, to give after asking is not even generosity:

Tilab, dog‘ibergansaxovatemas,

Saxoahlionisaxovatdemas.

Generosity such a thing is that the river king, looking with his eyes, first provides the soldiers with food, they do not leave any remuneration for what they claim; and then gives the workers and the martyrs the right, and then gives the people the right to a little more. This is to give food and necessary bats to whoever is hungry the next. Any given location for bragging, whether it is a hundred districts, whether it is a scrape – not a waste:

Mubohotilao‘zinetmasaziz,

Agar yuztumanbersa, gar birpashiz.

Ne sarfaylaro‘lsang, bunav’ aylasarf

Ki, busarferurasramoqtinshigarf. [8,442]

Navoi shows the king through the wisdom of Hurmus how the road of generosity should be. The chronicles are presented in the form of an admonition to the Badiuzzaman after the epic. The Sultan of the word estate addressed the prince in exchange for bob: O Prince, Iskandar was considered the shadow of God on earth in the sight of all the people of the world. His knowledge and knowledge were equal to the knowledge and knowledge of all the peoples of the world. Despite the fact that he knew so much, he would learn from everyone. Always a scientist-he saw the work of the council with the virtuous. I speak one or two mouths about it, my goal from this is to say that I hope that you will also hear these words and use these tips. Navoi Iskandar and 7 hakeem's wisdom on the rules of state administration and royal order came to the conclusion that the king himself must judge on the basis of Sharia and please the parents. So, in this chapter, the views of a total of nine scientists are presented, each of which is as important as the Hurmus mindset and relevant to our era.

Although it is not given in the style of stories in the book of Alexander, the general plot of the epic is impregnated with the question of generosity. In particular, after Iskandar Darius conquered his country, he began to rule the country with justice and gathered the people:

Qiyomatkunidanetarmanhazar,

Adolateturmanbataqvomagar.[10,510] said.

In the work, Iskandar was interpreted not only as a just king, but also as a strong righteous servant of faith. This is reflected in the fear of resurrection in the above verse. Iskandar himself, along with his fairness, urges the people to spend the day with his own efforts, helping the helpless:

Agar dundailkimgaganjkirsa gar,

Fido aylagumkimgaqismat u zar.

Berurmanharkimgabaxtdankalid,

Etibpoyayikoriharkasinipadid.

Hunarmandningboshinko‘targumbaland,

Eturmandevonanipoyiband.

Tekinxo‘rlaridaneturmanhazar,

Soqov, chorasizlaruzrlimagar.

Agar kuchlikordonibo‘lsayano,

Bekoryurmog‘ininaistarmano.

Ko‘rurmankishikichekarbo‘lsaranj,

Xayrishdayetmasangasarfiganj.

…bag‘ishlabjahongasaxobirlafarr,

Madadso‘zgabergumin’omizar.[10,510]

He establishes justice in the land of Iran, burns the cease-fire, marries Ravshanak and fulfills the will of Doro. This too was actually an appearance of generosity.

The issue of the generosity of the “Iskandarnoma” epic of NizamiGanjavi is also raised. First of all, while describing Iskandar notes that he is unequal in generosity:

Badavlaterdi-yusaxovatli, bas,

Yunondayo‘qerdiundanyaxshikas [12,64].

In the story of baker, too, it is briefly mentioned that Iskandar is a generosity. That is, he is so rich in such a short term that even if the king is so generously called a person cannot get rich by profession of bread in such a short term:

Shohisaxovatlishaharda, illo,

Kishinonvoybo‘lib, boyimasaslo [12,86].

When Iskandar reaches the level of the prophet, he jumps on a journey by the command of Allah and asks the doctors: Aristotle, Plato and Socrates to write a letter to him. These chronicles describe the regimes of the kingdom, just like the seven rulers in “SaddiIskandari”. They advise Iskandar in his chronicles. In the letter of Aristotle, it is called upon to stay away from the oppressors, to glorify the good, to do justice, and not to collect the treasure in vain, while telling the king not to oppress:

Xazinayelkangdayukerur, xalos,

Boshqalargabersang, bo‘lursenxalos [12,167].

Speaking of generosity, darveshs a part of it when the goods in your hand, the poor-he says the needy will be the shield of the plague of freaks, donation. It is necessary to do so secretly, even when making a donation. Only then can a person reach his goal:

Qo‘linggamolkirsamagarbeshukam,

Boridinehsonetdarveshlarga ham.

Nihoniyulushberyo‘qsilgahar gal,

Haqningxushnudliginarsadinafzal.

Kishikimnihoniyehsonqilgusi,

Ehsonibalogaqalqonbo‘lgusi.[12,168]

Plato king, in principle, says that it is necessary to eat a lot and be patient in the journey, to catch his soldiers in order, to deal with the event in each case, do not pour blood in vain, emphasizing that he will be far from women. It also calls the king generosity, like Aristotle:

Jahonsohibidirjahondainson,

Hamrohlariilabahamko‘rsa non.

Hamyoniniochib, xarjetsapulin,

Hal etsanechabiryo‘qsilmushkulin.[12,117]

Well, in both epics, one way of perfection is interpreted about generosity. Iskandar the world, calls the people to guidance, takes a lesson from good people (fruits and crops are without protection, but by the grace of Allah no one can touch the country (in the “Iqbolnoma”), gives food to them when they meet the people of the desert without food, teaches them the secrets of living well, flourishes the ruined countries.

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AL-BIRUNI AND ALCHEMY

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ABSTRACT

Abu Rayhan Muhammad ibn Ahmad al-Biruni (973–1048), an encyclopedic scholar from Khorezm, was engaged in almost all the exact and natural sciences known in his time and wrote about 150 works on them.However, based on the views expressed by the scientist in his works "India" and "Mineralogy", his attitude to chemistry was assessed negatively. Although al-Biruni sharply criticized the alchemists' idea of metal transmutation, in his scientific practice he used substances, instruments, and experimental methods used in chemical laboratories, i.e., a rational approach to the alchemy of his time.

KEYWORDS: *Khorezm, Al-Biruni, "Mineralogy", "Kitab Al-Jamahir Fi Ma'rifat Al-Jawahir", Alchemy, Transmutation of Metals, Synthetic Gold, Synthetic Silver, "Pharmacognosy".*

INTRODUCTION

The great Khorezm scholar Abu Rayhan Muhammad ibn Ahmad al-Biruni (973-1048) is known in the history of science as an encyclopedic scientist. Because he was seriously engaged in almost all the sciences of his time, especially the exact and natural sciences, as evidenced by his nearly 150 works in various fields of science. These works have been studied by scientists around the world for many years. As a result of this research, the scientist's significant contribution to the development of mathematics, astronomy, geodesy, geography, mineralogy, pharmacy, philology and history was recognized around the world.

Although al-Biruni'sencyclopedism appears in the fields of astronomy, mathematics, and the like, it has also left a significant mark on the natural sciences. In particular, his advanced ideas and practical experience in mineralogy, geology, pharmacology, and physics were innovative for his time.

But at the same time, al-Biruni's attitude towards alchemy, which was highly developed at that time and was the object of scientific interest of most scientists, was not as clear and positive as that of the aforementioned natural sciences. It is known that the 9^{th} – 11^{th} centuries were a period of development of alchemy in the Muslim East. By this time, the alchemical works of Jabir ibn Hayyan (721–813 or 815), the father of Oriental chemistry, and the great physician and

alchemist Abu Bakr Muhammad ibn Zakariyaar-Razi (865–925) were well known in scientific circles. Although these works also describe the chemical operations of making gold and silver artificially from ordinary metals, a number of minerals, chemical experiments, and instruments necessary for modern chemistry have been invented for this purpose. These substances and actions have been used not only in chemistry but also in medicine and mineralogy.

THE MAIN FINDINGS AND RESULTS

Naturally, al-Biruni, as a true natural scientist, was not indifferent to alchemy, but his attitude to this science has been negatively assessed so far (Mieli A:1922). The main reason for this is al-Biruni's critical approach to the attempts of alchemists to carry out metal transmutation in "India" and "*Kitab al-Jamahir fi Ma'rifat al-Jawahir*" ("Mineralogy").

For example, in his book "India", al-Biruni says: "Alchemy, although not called magic, is one of its types. You see, if this person shows a piece of cotton to someone for silver, it is not attributed to anything other than magic, and there is no difference in custom between showing silver as gold" (Rasulev, Hakimjonov, Jalolov's translation:1965).

There is a similar statement in "Mineralogy": "It is an undeniable fact that nature has created substances that people make artificially from metals better than them. But alchemists try to deny this. They think that the gold they see in their confused dreams is better than natural gold, because it is able to turn any substance added to it into gold, and natural gold does not have such power" (Belenitsky, Lemmlein, Baranov , Dolinina":1963).

Indeed, from the passages quoted above, there seems to be no room for doubt in this matter. But al-Biruni's remarks are aimed at the goal of alchemists, and there is evidence in his relevant works that the scientist made effective use of the tools and methods of chemical experimentation in his practice. This evidence can be found in the above-mentioned works of "Mineralogy" and "*Kitab al-saydana fi al-tibb*" ("Pharmacognosy") (Karimov:1974). This is also evident primarily from the sources used by al-Biruni.

In "Mineralogy", al-Biruni mentions the names of about twenty, and in "Pharmacognosy", more than fifty well-known natural scientists. Among them were works on alchemy by Jabir ibn Hayyan, Abu Yusuf Yaqub ibn Ishaq al-Kindi (d. 873) and Abu Bakr al-Razi's. For example, in the chapter on mineralogy on turquoise, and in 17 articles in "Pharmacognosy", excerpts from Jabir ibn Hayyan's *"Kitab al-nuhab fi al-tilsimat"* (The Selected Book on Talismans) are taken. They mainly describe the properties of minerals, their purification and artificial formation(Karimov:1974).

In both "Mineralogy" and "Pharmacognosy", al-Biruni used several works by al-Kindi. Of these, the one directly related to chemistry is called the *"Kitabkimiya al-'itrwa al-tasʿidat"* (The Chemistry of Fragrances and (Their) Dry Drying). It provides a description and details of 107 different methods of preparation of various fragrances and the tools required for this (Übersetzt von Kari Garbers Leipzig:1948).

In "Mineralogy", information on the properties of onyx (*jaz*) is derived from this work, and in "Pharmacognosy", a method of preparing a complex drug called "*ramic*" is obtained: "The greens are cut into two or three pieces in a mortar, not too small," he said. Then put them in an iron pot and heat with a stick until all it evenly is heated. After that, they are moistened with warm water and made into an ointment. Separately, boil a certain amount of Egypt *dushob* (grape or palm juice) until it is poured, soak the ointment prepared above with it and put it in a mortar. Wet the mortar handle in hot water and crush the ointment with it until it becomes a smooth mixture.

On a clean *saloya* (a stone used to feel substances) rub jasmine oil and put ointment on it. Lubricate the hands with jasmine oil, make small cakes from the ointment and dry in the shade. The cakes should be protected from dust and smoke" (Karimov:1974).

Ramik has been used in medicine as an astrigent drug as well as artificially prepared fragrances - the main ingredient of *sukk* and *gholiya*.

Al-Biruni respected Abu Bakr al-Razi as a scholar and used his works extensively. The titles of Razi's works weren't mentioned in "Mineralogy", but A.M. Belenitsky assumed that al-Biruni's "Book on Stones" on mineralogy and "Book on Yellow Stone" on alchemy, which has not reached us, and "*Kitab al-radd ' ala-l-Kindi fi raddihiy 'ala-l-sina'a"* ("Rejection of Kindi's book rejecting alchemy") [2: 406]. Excerpts from al-Razi's works have been used in the sections of Mineralogy on rubies, emeralds, corals, malachite, bodzahr, amber, "rain stones" and *harsini* (zinc). From these we find that the quote from *harsini*is taken from al-Razi's greatest work on alchemy, the *Kitab al-Asrar* (The Book of Secrets)(Kitab al-asrar, manuscript of the Abu Rayhan Beruni Institute of Oriental Studies,Uzbekistan Academy of Sciences).

In al-Biruni's "Pharmacognosy", al-Razi's book*Kitab al-hawi fi al-tibb"* (The All-Encompassing Book of Medicine), *"Kitab al-saydana"* (The Pharmacognosy), "*Kitab al-abdal*"(" Book of Substitutes"), *"Kitab al-aghziya"* ("The Book of Foods"), *"al-Tibb al-muluki*" ("The Medicine of Kings") and *"al-Kutub al-isnaʻashar"* on alchemiy " ("Twelve Books on Chemistry ") and the *"Kitab al-Asrar"* were mentioned.

The "Twelve Books on Alchemy" consists of 12 treatises, which al-Biruni referred to in his first tratise, *"Kitab al-madhal al-Taʻlami"* (Introduction to the Study of Chemistry), in an article by "Pharmacognosy" on *natrun*- soda(Karimov:1974). In addition to the cultural materials of this work, the articles devoted to *buraq*, *daus* (iron ore), malachite, glass, *zok*(vitriol), antimony, salt and mica contain relevant passages from *Kitab al-asrar*. They provide information on the appearance and properties of substances, as well as artificial preparation of some of them due to chemical changes. For example "... how to make a vitriol: dissolve the yellow vitriol in water and let all the particles dissolve. Then copper scrap is added and heated until solution turns green. The solution is then left until it turns into crystalline sediment. If they wish, for every 20 *dirhams* of vitriol, 1 *dirham* should be added and left".

As a result of this reaction, a copper sulphate salt was formed from the iron sulphate salt. In this article, there are several other methods of obtaining vitriols (Karimov:1974).

Another chemical source used by al-Biruni is the "*Kitabkimiyay*" (Book of Chemistry). Its author, Abu Zayd Ahmad ibn Sahl al-Balhi (850–934), was a student of al-Kindi and, according to some sources, a teacher of Abu Bakr al-Razi, engaged in philosophy, mathematics, astronomy, and geography (Karimov:1974). The reference to the "*Kitabkimiyay*" is given in the article "soda" and "vitriol" by "Pharmacognosy" (Karimov:1974).

A total of 107 minerals were included in the "Pharmacognosy", most of which was derived from alchemical works.

Al-Biruni discovered one of the most reliable methods of diagnosing substances still used in physics, mineralogy, and chemistry, in addition to the use of alchemical works and operations: he was the first in the history of science to accurately measure the comparative weights of several minerals, liquids, and metals. These comparative weights determined by al-Biruni differ very little from the specific weights measured in modern instruments. (Belenitsky, Lemmlein, Baranov, Dolinina: 1963).

CONCLUSION

To conclude, al-Biruni was engaged in almost all the natural sciences of his time and supported useful innovations for the development of science, using them in his scientific work. Realizing that the artificial production of gold, the transformation of one metal into another by chemical changes, the creation of a miraculous potion was the unattainable dream of alchemists, he was able to find a rational basis for their experiments and works and developed them in his works.

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SHUKURI'S LITERARY LEGACY

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ABSTRACT

The aim of the study is to highlight the life and work of a bilingual poet, as well as a monographic study of the literary heritage in the Uzbek and Tajik languages, analysis and interpretation of his poetic skill as a poet. The object of the study is the manuscripts of the Shukuri divan, kept under identification number 5022 at the Institute of Oriental Studies of the Academy of Sciences of the Republic of Uzbekistan and number 1581 at the St. Petersburg Institute of Manuscripts, as well as more than ten anthologies and collections, which include Shukuri's poems.

KEYWORDS: *Devon, Anthology, Gazelle, Heritage.*

INTRODUCTION

AbdushukurShukuri is a great representative of the Uzbek classical literature of the late 18th and early 19th centuries. He followed in the footsteps of his predecessors – Navoi, Fuzuli, Bedil and in his poems, along with love and wisdom, glorified honesty, purity, humanity, humility. He created unique works in Persian-Tajik and Uzbek languages. The fact that he was a poet is evident in the confessions of Vozeh, Hashmat, Sadri Ziya, and SadriddinAini in the 19th century. The fact that Shukuri's work has been studied by world scholars is another proof that he is a unique poet.

Just as Persian-Tajik ghazalism has a long and exemplary history, the ghazalism of poets who wrote in the Turkic language deserves special attention in the researches of dozens of our scholars, such as Professor A.Hayitmetov1, N.Mallaev[1], Yo.Isxakov[2], R.Orzibekov[3], O.Nosirov[4].Teacher M. Shaykhzoda divided the ghazal into romantic, orifona and rindona types. The fact that this classification itself is connected with the mystical teachings of the ghazal testifies to the fact that religious and mystical ideas also play an important role in it. Indeed, if

we imagine the ghazal genre as a raging river, one bank of which belongs to the metaphors and the other to the lovers of divine love. Literary critic Yo. Isxakov spoke about the same issue, emphasizing that secular love is not contradicted in the poetry of A. Navoi, the sultan of the ghazal kingdom: “Figurative love is considered as a manifestation of romantic reality or a specific stage in the path of real love. For a spiritually pure, spiritually perfect person, the metaphor itself is the truth”[5]. In mastering not only ideological, but also artistic secrets of ghazal, Shukuri, along with his teachers who wrote ghazals in Turkish, diligently and inspiredly studied the works of world-famous poets of Persian-Tajik literature, such as Saadi, Jami, Bedil. But his mentor, his unique inspiration, was Alisher Navoi. From Navoi he followed not only in the application of ideas, content, methods of expression, but also in the description of the spiritual state, spiritual changes in the inner world of man through color and color types. In this regard, it is commendable that he continued the Navoi tradition in a worthy manner.

Navoi's "Navodir ush-shabab" devon has the following ghazal:

Kirsa ul gul hirmani agyor ila gulzor ara,

Men hamonotolpinurmenxirmanetkanxoraro,

Mening: if she enters garden, and I still want to enter this garden too.

This ghazal consists of 9 bytes and is written in the rhythm aruzframe ramalimusammani mahzuf (foilotun, foilotun, foilotun, foilun — - V --).

Shukuri's devonalso has a ghazal with the same weight, "Yordin ayrilgoli zohir erurlar ko’zda yosh, O’q bulur zohir kavokib hayli chun botsa quyosh"(because of separation with my love, I cry every night when the Sun sits). Tradition and innovation are also evident in the idea and art in this poem. Alisher Navoi's ghazal contains a unique verse based on a beautiful metaphor: “Yashilo’smabilanzebberilganqoshlaringgulzorsahnidajilvagarbo’lganikkitovusgao’xshaydi**”,**
(Your eyebrows adorned with green color are like two peacocks fluttering on the flower garden)
:

Lojuvardiyvo’smabirlanzebberganqoshlaring,

Jilvagarbo’lg’onikkitovuserurgulzoraro.

In the following verse of Shukuri, we see that the same metaphor has been developed and a new side of it has been opened:

Lojuvardiyvo’smachekkanqosharoxolulmasal,

Ikkitovusgularobirdonag’aaylartalosh. (D. p.58)

That is, the poet likens the mole between the eyebrows with a green color to two peacocks fighting over a grain in a flowerbed.

At this point, Shukuri also refers to the image of the mole. It is well known that the mole is one of the traditional images with a unique symbol in classical literature. In it the beauty of the mistress is understood. The mole on the lover's forehead, like a divine miracle, adds more beauty to the beauty of the earth. These analogies are even more remarkable with their peculiar difficulty.

While Navoi's tashbeh (like metaphor) has a special charm, Shukuri's tashbeh is no different from his predecessor's in terms of bringing the unexpected scene to life in the eyes of the reader. In other words, we can say that Shukuri was able to hit the way of Navai. Since poetry is an art of direct figurative expression, it is important that the images in it reflect the problems of the period more vividly than other types. The importance of color in creating an image is incomparable. “The symbolic use of colors in the ghazal to reveal different aspects of the human

spiritual world is one of the methods characteristic of Navoi's ghazal. In Khorezm Ogahi and in Bukhara Shukuri wrote separate ghazals in this way"[6].

As the literary critic S.Utanova rightly noted, "In Navoi's poems the meanings of purity, accuracy, goodness, light, greatness, justice, and most importantly, beauty are widely covered"[7]. In Navoi's devon "Navodir ush-shabob", there is a ghazal starting like:

Ashkdan bo'ldi qarorg'on kulbai vayronam oq,

Kulbaivayrondemakim, diydaigiryonimoq,–

Meaning: because of love my dark hut is white (bright) now, not only my hut but also my eyes are white (bright).

Inspired by this poem, Shukuri composed the following verses:

Jilvaazminqildi men sorikiyibjononimoq,

O'ldihijrondinqarorg'onkulbaiahzonimoq.

Yo'qsavoduxattubo'stonilamaktabdin manga,

Ne ajabbo'lmoqlig'idaftaridevonimoq[8].

Meaning: in white dress my love came to me, my hut turned into bright (it was dark here). I don't know how to write well and how can my Devon be clear.

The mental state of the lyrical protagonist is revealed in the ghazal on the basis of black and white contrast. The lover's hut was darkened by the grief of separation. The hut is a symbol of the world of the lover. The world is also dark in his eyes from the intensity of separation. Then the visit of the white dressed mistress illuminates the heart of the lover. The poet expresses this situation through the transformation of black into white:

Tiyrashomingsubhyanglig' ravshano'lsa, ne ajab,

EyShukuriy, gar netibchiqsamohitonimoq.

Apparently, both ghazals are beautiful examples of poetry. The radiant ghazal "Gul" in Shukuri's devon is another beautiful example of the passages made to Navoi. The poem is entitled "Payravi Amir Navoi". This can be considered as an expression of Shukuri's boundless love for Navoi's work. Shukuri, like Navoi, does not contrast figurative love with real love, but sees figurative love as a means to reality. The lover sung by the poet is the meaning of life, the light of the heart.

In Navai:

Orazingni bog' arochunko'rdi, hayronbo'ldigul,

Bargsizqoldi, nedinkim, bas, parishonbo'ldigul.

Meaning: Seeing your face in garden, the flower was leafless and oblivious.

In Shukuri:

Ko'kniqobinchexradanchunsoldixandonbo'ldigul,

Bulbulibechoralarg'aofatijonbo'ldigul.

Meaning: seeing her face, flower was happy, it was a flower for pure nightingales.

It is known that Bedil and Fuzuli, thinkers and Sufi poets, had a strong influence on Turkish and Persian literature. In Movarounnahr, for example, Turkic-speaking poets followed Fuzuli and Persian-speaking poets followed Bedil. Of course, Shukuri is no exception. We see the influence

of Fuzuli in his Turkish work and Bedil in his Persian work. Shukuri completes a number of taboos on Fuzuli's ghazals. Here is an example:

Ochargulorazin, bulbulninolono'ldig'inbilmaz,

Chu g'uncha hasta ko'nglitah-batahqono'ldig'inbilmaz[9] –

Meaning: *she shows her face, without knowing, he and his soul are destroyed.*

He called his ghazal "Payravi Fuzuli". Also, under the influence of the great Azar poet, composed ghazals such as "bilmaz", "bengzattim", "chu" . However, while these taboos have much in common with the poems that inspired them in terms of rhythm, rhyme, and radiance, their themes, ideas, and metaphors are entirely new.

Shukuri continued the traditions of his predecessors and also created *romantic,(ghazals in the description of love)orifona (ghazal is written completely in one rhythm)*and *rindona(ghazals in the description of wine)*samples of lyrics. If we look at the semantic structure of the poet's poems, we can see the mystical concepts and symbols, oriental images and expressions, traditional and symbolic figurative images. This clearly shows that the poet is determined to continue the traditions of the East, in particular, the Uzbek ghazal. Traditional images and concepts that are widely used in our classical poetry in Shukuri's poems:*chashmaihayvon, sunbul (a plant), ko'z (eye), oraz (face), xat (written, husn (beauty), lab (lips), xol (mole), rafiq, zulf (hair), quyosh (sun), oy (moon), gul (flower), bulbul (nightingale)* as well as *Christ , Layli, Majnun, Iskandar*, *Hizr* and many others.His poems are diverse in terms of subject matter. They cover social, moral, romantic, philosophical and other topics. In the poems of the poet, a certain theme does not lead, but the fact that he addresses different topics is the product of his attitude to life, to society. The theme of love in Shukuri's poetry is also distinguished by its unique diversity. This theme has been repeated over and over again in classical literature, and many royal works have been created in it. In his lyrics, the poet sang, along with divine love, love in the broadest sense, a man burned in the flame of love. The desires, aspirations, struggles, experiences, joys and sorrows of this person are the essence of the poet's poems. Along with the oral tradition of the people, the best traditions of our centuries-old poetry have played an important role in the development of the poet's lyrics, both ideologically and artistically.

"Poetry is the pursuit of light, of spiritual enlightenment. A poet is a person who sees the world in clear realities and shakes his pen in bright emotions, he lives in pain not only in the external world, but also in the inner world of a person"[10] – said teacher I. Haqqul. These ideas also apply directly to Shukuri's work. In the works of the poet we see that the call to love through poetic images and the glorification of a higher feeling play a central role. The age-old theme of classical literature, the innate feelings such as love for the Truth and attainment of Him (Allah), are beautifully and uniquely expressed.

One of the poet's poems on social issues is the ghazal "Diram". In this poem, which consists of 5 bytes, he truthfully reveals the injustices in life, the abominations of officials:

Va'da qildi ul bahori lutfi davlat ***yuz*** *diram,*

Yuz*chamanochtiko'ngilbo'gidaharyolg'uzdiram*[11].

Meaning : officials promised to give diram (money), although many times passed, they did not give.

In this byte he expresses his opinion through the art of repetition. That is, in the first verse, the word ***yuz (a hundred)*** is a rhyme, and in the second verse, the word ***yuz*** is an adjective. The poet says that the diram (coins) in the garden of the heart was opened a hundred times as a

flowwerbed, because great promises were made by the heads of state. Shukuri has suffered a lot as a representative of the common people. The income from his profession was not enough to live on.

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ANALYSIS ON NUMEROUS HANDOFF APPROACHES IN MOBILE AD HOC NETWORK SURROUNDINGS

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ABSTRACT

Communication has never been the same since the introduction of cellular phones and many apps with varied functions seem to spring up on a daily basis. Various uses appear to spring up on a daily basis. Ad hoc networks were created with the aim of establishing networks made up of linked nodes, on-the-go. Ad hoc networks have many uses, the most common being vehicular ad hoc networks (VANETs) (VANETs). In VANETs, moving vehicles are regarded to be the mobile nodes and mobile vehicular nodes travel at high speeds. Mobility of the nodes makes it challenging to establish reliable communication connections between the nodes and the access points. A technique known as handoff is utilized to bridge this gap and is regarded to be one of the solutions for unreliable communication connections over longer distances. Handoff may typically be observed when the nodes are mobile and start to migrate away from the access points. This article examines and compares different handoff techniques that were presented by various researchers with an aim to enhance favorable characteristics while negating the rest of the components that do not assist in improving the efficiency of the handoff procedure.

KEYWORDS: *Ad Hoc Networks, Handoff, Switching, Routing, Access Points, Cross Layer.*

1. INTRODUCTION

Many handoff techniques have been suggested by various researchers, which aim at making the procedure an efficient and effective one. Handoff aims at re-establishing communicational connections and reconnecting mobile nodes and access points if the mobile node moves out of the coverage area of the access point or cell which is presently providing service[1]. TAPs are chosen based on a variety of factors which may include the distance of the TAP from the MN, the direction in which the MN is moving, the network selection type, etc. The technique of handoff is classified into many divisions which are dependent on the number of networks that are engaged in the process and the number of access points that the MN is connected to at the same time during handoff, inside the network. There are two kinds of handovers depending on the number of networks that are engaged in the procedure. They are horizontal handoff and vertical handoff. Figure 2 shows the classification of the different approaches based on the number of

networks engaged in the handoff procedure. Horizontal handoff is when the changeover process takes place inside the same network whereas vertical handoff is when the handover process occurs across different networks.

1.1.Heterogeneous Networks

Heterogeneous wireless networks (HWN) belong to the family of radio-based access networks which are constantly developing[2]. Basically, HWN is made up of various wireless networks such as Wi-Fi, WiMAX, LTE, Bluetooth, etc. Every network has its own set of characteristics which makes it distinct from the rest of the accessible technologies. Attributes such packet rate, delay, latency, energy consumption, range of the network, protocols are part of the network, the amount of space that the network and data related to it takes up, etc. are evaluated. These cells include picocells, microcells and femtocells and they are effective when it comes to boosting the capacity of the system on the whole, by decreasing the distance between the APs and the MNs, thereby lowering the amount of power needed to maintain strong communication connections.

1.1.1. Cognitive Radio-Based Network

CR-based networks, if utilized effectively, may reduce spectrum usage. Unlicensed users may also make advantage of the available spectrum without creating any interruptions for the main users who are broadcasting inside their allocated channels, with the help of CR networks. Features such as spectrum sensing and data transmission functions have been introduced to the physical layer of CR networks. Attributes such as decision-making ability for spectrum, the mobility of spectrum, spectrum sensing and spectrum sharing have been added to the list of characteristics that the MAC layer of CR networks can brag about. The sole distinction between the network layer of CR networks and the conventional system is brought about by the fact that the availability of the spectrum impacts routing[3].

1.1.2. Handoff in Heterogeneous Wireless Networks

The pace of transmission of data may be improved with the usage of multi-network vertical handoff since this allows the MN to communicate through the optimal network, thereby increasing the overall quality of service (QoS) (QoS). A vertical handoff (VHO) decision-making technique has been suggested and the primary emphasis of VHO lays in overall load balancing. The VHO technique likewise attempts at optimizing the quantity of electricity consumed[4]. To pick the most optimum network when confronted with numerous network choices, a path-selection is also incorporated in the approach. Controllers which are known as vertical handoff decision controllers (VHDCs) are installed in the APs. The controllers offer the handoff determination function for a specified area comprising a single AP or many APs. IEEE 802.21 or the media independent handover function (MIHF) is utilized for collecting the data that comprise the decision-making inputs.

1.1.3. Spectrum Handoff Based on Sequential Sensing

The technique also focuses at minimizing the number of handoff that takes occurred for every secondary user transfer. Rather of just conducting sequential sensing of all channels, candidate channels are chosen for every secondary user so that an idle channel that has no other secondary users competing for it may be identified with the least amount of overhead and processing complexity[5]. At initially, when the unlicensed secondary user transmits in the default channel, it is expected that the transmission that is presently occurring over the default channel would continue for a certain period of residual idle time of the current channel, which is predefined. When the idle time duration available for the present channel falls below a certain threshold, it indicates that the main user will use that channel in a short period of time and the secondary user will have to be ready for spectrum handoff.

1.1.4. MIH Standards-Based Handoff

IEEE 802.21 suggested media-independent handover (MIH) standards. This was intended at providing the required assistance for changeover across networks of various types by taking into account signal strength of an AP as its sole criterion for TAP selection [6]. In addition to the characteristics that are evaluated by the MIH standards, a few additional factors like the mobility of the node and network environment are taken into account by the approach. Data from the application layer and the link layer are utilized for determining choices about handoff and this dual layer information exchange is to maintain the MN connected at all times and to make the transition during handoff as seamless as possible. HD portion of the handover process is responsible for choosing the candidate AP from a list of possible TAPs. If there is just one network that is accessible, then the candidate is.

1.2.Horizontal Handoff Methods

Handoff that takes occur inside the same network is known as horizontal handoff. It is a lot easier than vertical handoff as it does not need to incorporate the complicated process of choosing the best candidate in an optimal network for handoff. Here, a few horizontal handoff techniques which were suggested are described.

1.2.1. Handoff Using Early Binding

Early binding technique for handoff in wireless mobile IPv6 (MIPv6) is suggested. MIPv6 were developed in order to improve the efficiency of MNs since they were usually constantly in a dynamically changing state or a highly mobile state. This enabled the nodes to interact much quicker without having to spend time in sending and receiving request–reply messages that authorized channels for communication[7]. Duplicated address detection (DAD), CoA, mobility detection and binding updates are the components of MIPv6. Early binding therefore helps the MN by providing it with greater amount of time for communications during its stay inside the border of the target cell. This guarantees that the slow-moving MNs need not rush since they have ample time for information exchange. Flags are utilized to determine whether the MNs are slow-moving or fast-moving and the AP can also recognize if the nodes are stationary or not by comparing the time required to cross the border of the cell with the amount of time it spent in the previous cell.

1.2.2. IPv6 VANET Handoff

To evaluate and forecast the approach of a TAP, a method called as angle of arrival (AoA) is utilized by the CAP. The AoA of the MN or other access points are computed by making use of a static infrastructure as the point of contact. To achieve a smooth handover, the network layer initially handed over to the TAP while the data link layer is still linked to the CAP [8]. The information at the router which is managing the CAP and the TAP is updated whenever a handoff happens. Then the emphasis is on the mobility handoff of the MN, between the two cells that are being addressed. When the MN approaches the border of the TAP, it pings an MN that is presently connected to the TAP about its approach and that MN in turn notifies its router about the approaching MN. Neighboring cars are utilized for adopting cost-cutting techniques and to minimize difficulties.

1.2.3. MIPv6-Based Handoff

A pinging packet or message known as the vehicular router solicitation (VRS) message is utilized like a proxy to notify the CAP if the MN is about to leave its boundaries. All of the AP IDs, MN IDs and the router IDs are provided in the form of handover assist information (HAI), which travels along with the proxy message. The appropriate TAP is then chosen based on the information which is provided by the HAI, resulting to efficient handoff [9]. A proxy advertising

message is then sent to the MN including the IP address of the TAP while the TAP gets a handover initiation message that includes the IP address of the MN to which it responds with a handoff initiation acknowledgment message. TAP starts to buffer the packets intended for the MN that are being routed by the CAP via a bidirectional route that is set up. Once the acknowledgment for the binding update request is received, to guarantee smooth transition, the MN detaches itself from the CAP's data connection layer and becomes connected to the TAP. The buffered packets that are held at TAP are now sent to the MN.

1.2.4. Handoff Using CoMP

A coordinated multiple point (CoMP) transmission inside femtocell networks is suggested in the technique from [42]. Femtocell networks are employed in the present technological environment in order to bypass the difficulties which ail traditional communication networks. These networks assist in smooth improvements over current networks and their components by offering better coverage, increased signal-to-interference plus-noise ratio (SINR) and optimum energy use. A moving train is regarded to be the fast-moving femtocell node in this situation. When the second compartment follows through and reaches the border of the servicing AP, it conducts handoff and becomes attached to the eNodeB to which the first compartment's transceiver is linked to. Thus, there is no need to spend time in looking for an appropriate eNodeB.

1.2.5. HMIPv6-Based Handoff

MIPv6 does not respond to the need for managing localized mobility in particular and instead makes use of the same method it uses for global mobility to solve the problem of handling local mobility [44]. A node known as mobile anchor point (MAP) is utilized as a local agent to assist in the handoff process within localized mobility. MAPs are used instead of the foreign agents in MIPv6 and they may be contained anywhere in the hierarchy of routers. Contrary to MIPv6, PMIPv6 is implemented by the network itself as it records the motions of the MN and regulate mobility management. The network topology learning method is made up of definitions and theorems which are based on the number of hops, the connections that exist between the nodes, the distance between the nodes, etc. When the distance between the forwarding server and the MN exceeds a pre-defined threshold, a new FS is chosen by the MN, which happens to be the nearest FS.

1.2.6. Proxy MIPv6-Based Handoff

Packet loss ratio (PLR) rises owing to a significant loss of data packets when frequent handovers occur in a mobile environment. This will also increase latency in the network. As shown in earlier approaches, making advantage of early binding changes may minimize latency and delay in handing over, thereby avoiding the loss of packets. A mobile access gateway (MAG) is responsible for managing a collection of IP addresses which are given by a network administrator. Once the target gateway has been identified, the source gateway will inform the target gateway about the incoming MN so that the next gateway may get ready for handoff by assigning a local IP address for the MN. At the local mobility anchor, a binding update entry will be made. An information request acknowledgement (IRA) will be issued by the gateway to the MN which is entering into its coverage area so that the MN may sync its IP address with that of the target gateway while remaining connected with the source gateway.

1.2.7. RFID-Based Handoff

This technique was developed since it was discovered that cars experienced zero breakdown in communication channels provided that the APs and the MNs remained static. Due to the extremely mobile environment of vehicle networks, it is essential for a system that conducts rapid handoff. Each vehicle's chassis is equipped with an RFID tag and is given a unique identifying number called the MAC address[10]. LVS includes information such as the MAC

address of the vehicles, the IP addresses of the cars and the AP IP addresses. Yet another server known as the global vehicle server (GVS) maintains information on the location of the cars, the IP addresses of the vehicles and the IP addresses of the access gateways. The home address of all MNs are allocated by the HA. GVS also maintains a second database known as the vehicle address relation table which contains the MAC addresses and the home addresses of the MNs.

1.2.8. Mesh Network Handoff

A home mesh router (HMR) is essentially the coverage area of a cell inside which a node sits. Whenever the node exits the HMR, the handoff procedure is initiated. The selection of a candidate router or the foreign mesh router (FMR), which is essentially any router that is not its home router, is dependent on the SINR values of that router. To become connected to any prospective FMR and to initiate communication, the node has to be verified by the FMR in question. Due to the time required for the FMR to verify the MN, latency and overall delay increase. Between a mesh client and a mesh server, a master key is produced and between chosen mesh routers, a group master key is generated to assist in quicker authentication procedures. All routers get tickets produced by servers for individual mesh routers. Whenever the roaming client or the MN is able to match the key it possesses with the publicly accessible key, handoff will be started.

2. DISCUSSION

Every technique described in this research follows a distinct strategy for conducting handoff procedures. Others of the techniques attempt to decrease the total latency, some try to minimize the amount of power used, still methods try to increase the speed with which connections are formed, while some others try to develop a system for choosing optimum networks from a list of accessible networks. The numerous techniques and the many characteristics they concentrate. We can also observe the approach each technique takes.

3. CONCLUSION

The study's aim is to examine different handoff techniques that were suggested by many scholars. Every technique described in this article has its own set of important characteristics and distinct methods to improve the handoff process. Identifying the essential characteristics of each process is what the article focuses at. The various approaches have been classified depending on the number of networks involved, viz. vertical handoff and horizontal handoff. It has been found that vertical handoff techniques are dominating in delivering seamless connection across various networks. Commercially viable applications are being developed based on the various vertical handoff methods available. Every technique has its benefits and drawbacks which may be seen from the preceding talks and outcomes. It may be observed that many approaches concentrate on improving a particular characteristic of the networks involved. Most the techniques make use of just a single characteristic such as signal strength, in order to conduct handoff when in fact, many variables play important roles in improving the handoff process. In the future presenting a handoff technique by selecting winning characteristics from a chosen few ways have to be done. Multi Attributes Decision Making (MADM) techniques may be explored in order to enhance the overall efficiency of a handoff procedure.

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CACHE MEMORY STRUCTURAL DESIGN FOR HANDLING BIG DATA USAGES

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ABSTRACT

A cache is a hardware or software component in computing that stores data in order to serve future requests for that data more quickly; the data stored in a cache could be the result of an earlier computation as well as any copy of data stored elsewhere. The efficient execution of today's big data-based applications relies heavily on cache memory. Multicore processors are being used in the high-performance computer to support parallel execution of multiple applications and threads. Chip multiprocessors combine multiple multicore processors into a single chip (CMP). Each core has its own private cache memories, as well as the last-level cache is shared by all cores (LLC). When it comes to handling big data-based applications, LLC's performance is critical. This paper conducted a survey of the novel techniques proposed for efficiently handling big data-based applications in the LLC of CMPs in this paper.

KEYWORDS:*Big Data, Cache Memory, Multicore, Processing, Near-Data.*

1. INTRODUCTION

Cache memory is one of the most important components in today's processors. Multiple cores are packed onto a single chip (or die) in today's processors, which is known as a chip multiprocessor (CMP). Each core in CMP has its own cache memory, and all cores share a huge shared last-level cache (LLC). Each core has its own L1 cache, and as LLC, all cores share an L2 cache. Cache architectures must be modified to accommodate such large data-based applications as the data demand of the applications grows. Increasing the cache size is a straightforward way to deal with large amounts of data. However, boosting cache isn't easy. A big cache may enhance the number of hits in the cache, but it will also increase the time it takes to search for a block inside the cache, increasing cache access latency.

Many layers of cache are the answer, although such designs are outdated, and today's commercial processors all feature multiple levels of cache memory. As a result, more sophisticated technology is needed to deal with such problems. We conducted a review of current research efforts aimed at improving cache performance in this article. The LLC is the primary focus of this study. To enhance the performance of LLC, research has been conducted in

a variety of areas. Reduced cache access latency and lower miss rate are the two most significant goals. The number of hits in the cache increases as the miss rate decreases, improving the system's speed.

With such a low rate of cache misses, a data-intensive application with great temporal locality would benefit. Many methods have been suggested to decrease miss rates. Large-scale LLC access latency reduction is also a significant research topic. When a bigger cache is utilized to decrease the miss rate, the cache access latency rises. However, a lower cache size increases the incidence of misses. As a result, building a better cache architecture is difficult, and it is a significant research topic. The primary aim of providing a better LLC design is for the system's performance to improve. Cycles per instruction (CPI) or instructions per cycle (IPC) are often used to evaluate performance.

1.1. Cache Management

The majority of today's cache memories are set-associative caches, which have several sets with a fixed number of ways each. The set-associative cache is similar to a two-dimensional array in which the sets are termed rows and the ways are called columns. A cache block is stored in each array element. Based on the set index from its address bits, a block may always map to a fixed set. As a set index, certain bits from each block's address are reserved. The block may be put anywhere in the appropriate set (column). If the set is already full, the replacement policy chooses a victim block to replace with the new block. To search a block inside the cache, you must search all of the ways in the corresponding set at the same time.

1.2. Access Latency Reduction

Uniform access latency (UCA) was used to access cache memory at first[1]. When the cache is tiny, such a uniform cache works well; however, today's big caches (particularly LLC), such as UCA-based caches, cause delay overhead.

1.2.1. NUCA

The cache is split into several banks to minimize the latency overhead of UCA. Each bank functions as a stand-alone set-associative cache, and all of the banks are linked via on-chip networks. To communicate among the many on chip modules, the on-chip network, also known as network on chip (NoC), is utilized as an alternative to the bus. Figure 1 depicts a NUCA design in action. The graphic depicts a CMP with four cores and an LLC split into 16 banks. The remaining higher layers of cache memory, with the exception of LLC, are not shown in the image. The primary benefit of NUCA is that each bank can be accessed separately, and local banks can be reached considerably quicker than banks farther away. If the fourth core wants to access a block from bank-15, for example, it can do so considerably quicker than if it wants to access a block from bank-0. To access bank-0, some on-chip communication is needed. NUCA-based designs are used by the majority of today's LLC. The NUCA proposal enables the usage of high size LLC without incurring significant latency overhead, which is critical for executing big data-based applications.

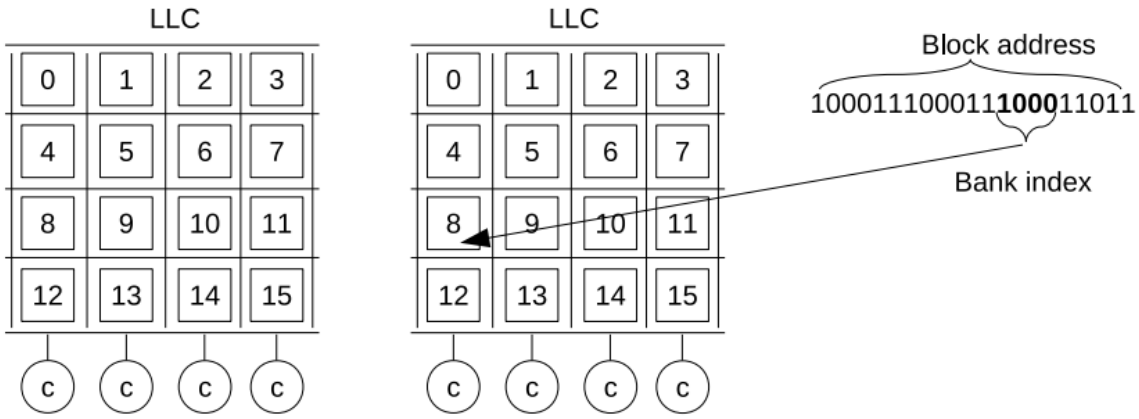

Figure 1: An example of NUCA as well as SNUCA

Static NUCA (SNUCA) and Dynamic NUCA (DNUCA) are the two kinds of NUCA architectures accessible (DNUCA). SNUCA and DNUCA have the same physical structure, but their data (block) management policies are different. A block can only be mapped to a specified bank using the bank index bits in SNUCA. Similar to the set index, certain bits from the block address are utilized for the bank index, and a block automatically maps to a fixed bank depending on these bits. The block in Fig. 2b, for example, translates to bank 8 using the bank index 1000. SNUCA is a basic and easy-to-use program. Because a block always maps to a specific bank, the block searching method is extremely simple. SNUCA is utilized by several technologies suggested because of its easy data management policy.

SNUCA's biggest flaw is that it can't transfer blocks from one bank to another. In Fig. 2a, the core requires more time to obtain data from bank-0 than from bank-15. If a block A in bank-0 is repeatedly requested by the core, then every time the block must travel via the on-chip network to reach the core, SNUCA must be used. It would be preferable if the block could be moved to a nearby bank. In SNUCA, such migration is not permitted. Banks may also exhibit additional non-uniform characteristics as a result of fixed mapping[2]. Data may be migrated from one bank to another via the DNUCA.

DNUCA divides the banks into many banksets. Each column in Fig. 2a, for example, may be regarded a bankset. Any bank inside the bankset may be used to put a block. As a result, a block may be transferred from one bank to another (within the bankset) as needed. Other non-uniform bank behaviors may also be removed using DNUCA-based design[3]. DNUCA's primary activities are as follows:

- Searching: To search a block, you must first search the whole bankset. DNUCA's block search is time intensive, and it has to be improved[4].

- Migration: A highly utilized block from one bank may be moved to a bank that is nearby. Despite the fact that DNUCA has been shown to be a superior design than SNUCA, effective implementation of DNUCA poses certain difficulties. Researchers are still working on speeding up the search process, lowering migration costs, and so on. The next section addresses the problems with DNUCA and some of the novel solutions suggested to address them.

1.2.2. Problems with DNUCA

The major problem with DNUCA is the time it takes to search for blocks. Because all of the banks in the bankset must be searched, a more efficient searching strategy must be employed. In DNUCA, there are three fundamental searching policies:

- Incremental: Go through the banks one by one, one by one. This method is less complex and requires fewer network communications. However, it may increase search latency; in the worst-case scenario, all four banks must be searched.

– Multi-cast search: In multi-cast search, all banks are searched at the same time. Although this method is quick, multi-casting may raise network communication overhead, causing congestion and excessive power consumption.

- Mixed: In a mixed search, certain banks are searched at the same time, while the other banks are searched one at a time.

1.2.3. Problems with DNUCA

There have been a slew of additional search methods suggested. A study proposes a clever searching method[5]. Instead of scanning all banks, the suggested method keeps a record (partial tag record) that allows it to search a smaller number of them. If the bankset includes eight banks, for example, the clever searching method may direct you to search just four of them. To keep the partial tag information of each block in the cache, such a clever searching method requires extra storage[6]. Each bank in NUCA is a set-associative cache, as previously stated. Each block in a setassociative cache must be assigned to its fixed set depending on its set index. The capability of DNUCA migration is limited by this feature of set-associative cache.

The frequently utilized blocks in DNUCA may be moved to a nearby bank. If a large number of such frequently used blocks map to the same set, placing all of the blocks to the closest bank is impossible. As a result, the set-associative cache rules restrict the power of migration in DNUCA. To address this problem, a number of novel approaches have been suggested[7]. The tag portion is kept close to the core, thus searching takes very little time. The information is kept in banks. Forward and backward pointers preserve the mapping between tag and data. The matching forward pointer indicates the position of the data after the tag is discovered. Because the mapping is done via forward/backward pointers, the conventional set-associative property is not needed to be maintained.

More blocks may be moved to the closest bank using this method. All of the suggested methods work on both single-core and multicore CPUs (CMP). DNUCA has several specific difficulties when it comes to CMP implementation[8]. The primary problem is migration; since a block may be requested by several cores, it may travel in various directions at different times without stabilizing. The author of [10] suggested an updated migration rule that enables a block to migrate after a certain amount of accesses. As the number of cores grows, so does the size of LLC and the number of banks. In CMPs, bankset searching introduces some additional problems. Multiple cores may now request the same bank at the same time, allowing multiple search operations for the same block to take place at the same time. Multiple miss requests for the same block may be produced if such simultaneous block searches are not handled properly. The author suggested HK-NUCA, a DNUCA-based CMP [9]. The creator of this design keeps a home bank for each block. The home bank is aware of the location of the bank's present location.

1.3. Replication of Data

It is occasionally advantageous to duplicate certain data in CMP when several cores share the same LLC. Due to the complexity of DNUCA's searching process, researchers are also attempting to enhance SNUCA's performance via data replication. The author suggested a method for storing a duplicate of the highly requested blocks in the local bank (or nearby bank)[3]. If an L1 miss occurs, the block will be checked first in its local bank, and if the block is not located there, the request will be sent solely to the home bank (bank where the block maps). It lowers the time it takes to connect to a distant bank. However, for replication, an extra coherence mechanism must be maintained.

1.4. Missed Opportunity Rate

For today's large data-based systems, lowering the miss rate (miss per instruction or miss per thousand instructions) is critical. With a lower miss rate, there are more hits in the cache, which increases system speed. Using a bigger size cache to decrease miss rate is not the ideal approach, as stated in Sect. 1. The LLC of today is already bigger in size. The effective usage of such LLC may further improve the miss rate. The writers found that the cache memory's full space is not being used correctly[10]. In the case of a set-associative cache, certain sets have a high miss rate, while others are almost inactive. The cache's usage factor is reduced as a result of this non-uniform distribution.

Cache miss rates can be reduced using better cache usage methods[11]. The majority of these studies are based on dynamic associativity management, which entails dynamically raising or reducing a set's associativity. Allowing a frequently utilized set to employ some of the methods of other idle sets increases its associativity. Another problem with usage is the banks' non-uniform load distribution. Some banks are overburdened, while others are almost inactive. Techniques to equally disperse the burdens across all the banks have been suggested. Cooperative caching is the most common method suggested[2]. A highly utilized bank may leak a block to its neighboring bank using this method.

The majority of these methods need the use of a costly centralized directory. The author of suggested a DNUCA-based Tiled CMP to transfer loads equally across various banks. Replacement policies and victim caches are also helpful in lowering miss rates [4]. Each set in a set-associative cache has its own replacement strategy. When a freshly acquired block has to be put in cache but there isn't enough room, the replacement policy chooses a victim block from the cache to replace it. Most conventional caches pick victim blocks from the cache based on the least recently used (LRU) criterion. The LRU policy is simple to implement, but it has several significant flaws, such as dead blocks and blocks that are never reused. If a block is never utilized again until its eviction, it is considered dead in cache. A block that is never reused and is only accessed once in cache.

Unnecessary cache space is squandered by such blocks. They can only be evicted in LRU if they become the set's least recently used block. Techniques for removing such dead blocks early have been suggested [1]. The use of victim caching may also help to lower the miss rate. The evicted block is kept in a tiny storage called the victim cache in this method. If the cache contains a miss, the victim block is checked before proceeding to main memory. An off-chip main memory access is prevented by a hit in the victim cache.

1.5. Processing of Near-Data

Near-data processing (NDP) is the most revolutionary method suggested for managing large data applications. In the age of big data, every application has a massive amount of data and must perform numerous costly and time-consuming computations[8]. As a consequence of these needs, dedicated systems for high-performance computing have been developed. Despite the fact that such high-performance and parallelized computers have been proposed, cache memory and computation remain a bottleneck.

2. DISCUSSION

The term "processing big data" refers to the act of performing an operation on a large amount of data. Searching, inserting, sorting, and other operations are possible. It could also be an arithmetic operation such as addition, subtraction, multiplication, division, or a bit operation, among others. SQL, which was created to handle large amounts of data, is one example of such a calculation. All such calculations are performed by the ALU of the cores in conventional computers. As a result, all of the data must be fed into the core before it can be computed. As

previously stated, CMPs with many cores have complicated internal architecture, including several cores, banks, and an on-chip network. It has been discovered that the data transmission cost is more important than the data processing cost in today's applications.

The cost of transferring a block from memory to the core via all levels of caches is referred to as the data communication cost. Congestion, delay, and power consumption all rise as a result of this kind of communication. As a result, even when several cores are used, the system's performance may not be as anticipated. To minimize such communication cost, researchers have suggested an alternate method termed NDP. Rather of transferring data to cores for processing, NDP moves the computing unit closer to the memory. Some simple computational units (SCU) are positioned near the memory units, such as main memory and LLC, to accomplish this.

These SCUs can only do a restricted number of tasks. Some SCUs, for example, can only do addition whereas others can conduct comparison. It should be noted that SCUs like cores are intended for a particular task and cannot be configured for general-purpose computing. Let's say you need to find a student's name in an 8-gigabyte file. If a customized SCU is placed in memory in NDP, the SCU may execute the calculation in memory, eliminating the need to transmit data to the cores. As a result of the near-data computation, the on-chip network overhead is reduced, and LLC performance is improved.

3. CONCLUSION

The efficiency of the last level cache (LLC) in today's high-speed computer must be improved for efficient execution of large data-based applications. Multicore processors, also known as chip multiprocessors, are utilized in such computers and combine many cores onto a single chip (CMP). Each core has its own private cache memory, while the LLC is shared by all cores. Many difficulties exist while designing an efficient LLC for CMP, such as latency overhead, usage overhead, and so on. We conducted a review of the novel methods suggested for the LLC of CMPs to effectively handle big data-based applications in this article.

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CACHE-COHERENT DISTRIBUTED SHARED MEMORY AND THEIR OUTLOOKS ON ITS DEVELOPMENT AND FUTURE CHALLENGES

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ABSTRACT

Multiprocessors were developed using two main architectural approaches in the 1980s. The dominating design for modest numbers of processors (usually fewer than 16 or 32) was a single shared memory with numerous processors linked by a bus. Dispersed shared memory is an architectural concept that uses physically distributed memories to enable multiprocessors to support a single shared address space. For multiprocessors with moderate to large numbers of processors, hardware supported distributed shared memory is becoming the dominant approach. Cache coherence enables such systems to utilize caching to exploit locality in applications without affecting the programmer's memory model. The Stanford DASH multiprocessor, the first functional implementation of hardware-supported scalable cache coherence, is described. We cover the major advances that led to the invention of cache-coherent distributed shared memory. We then provide our take on such designs and explore some of the major technical difficulties that remain.

KEYWORDS:*Cache Coherence, Directory-Based Cache Coherence, Distributed Shared Memory, Multiprocessor Architecture, And Scalable Multiprocessors.*

1. INTRODUCTION

All processors have an equal connection with the centralized main memory, these machines are known as bus-based multiprocessors or symmetric multiprocessors (SMPs). For modest processor counts, bus-based, shared memory multiprocessors remain the most popular design. Designers dispersed memory across the machine and utilized a scalable connection to allow processor–memory couples to interact to expand to higher numbers of processors. Message-passing architectures, called after the mechanism through which processors interact, were the most common kind of multiprocessor until the early 1990s[1]. Message-passing architectures are sometimes known as multicomputer since they are made up of independent processing nodes that share nothing except the connection. These computers are also known as distributed address space architecture machines. In the 1980s, a limited number of architectures were created that had physically dispersed memory yet used a shared memory paradigm.

Each of these two primary approaches had its own set of benefits. The conventional programming paradigm, which viewed memory as a single, shared address space, was supported by shared memory architectures. Because the processors interacted via shared memory rather than a software layer, the shared memory machines had reduced communication costs. Distributed address space designs, on the other hand, offered scalability benefits since they were not limited by the limitations of a single, centralized shared memory or bus. Despite these scaling benefits, message-passing computers' success has been severely restricted, particularly at lower processor counts, due to the difference in programming paradigm from the prevalent small-scale, shared memory multiprocessors (e.g., less than 64 processors).

1.1.Distributed Shared Memory (DSM)

DSM is an architectural concept that aims to solve the scaling constraints of symmetric shared memory multiprocessors while keeping the shared memory communication and programming paradigm. DSM multiprocessors do this by using a memory that is physically dispersed but conceptually implements a single shared address space, enabling the processor to interact across the whole memory and share its contents. DSM multiprocessors are organized similarly to the devices shown in Figure 2. DSM architectures initially emerged in the late 1970s and early 1980s, in the form of three early multiprocessors: The Carnegie Mellon Cm, the IBM RP3, and the BBN Butterfly[2]. All of these computers used a common address space, which meant that the time it took to access a datum was determined by its location. As a result, such designs were given the term non-uniform memory access (NUMA) computers[3].

Although the actual time to access a datum in NUMA systems may vary depending on whether memory held the requested address, in practice there was a significant difference between addresses in local memory and addresses in distant memory. It was difficult to program these early DSM multiprocessors because access times might vary by a factor of 10 or more, and there were no easy methods to conceal these disparities. The usage of caches in uniprocessors hides the fact that memory access takes a lengthy time. However, as we'll see later, modifying caches to operate in a multiprocessor system is difficult.

1.2.The Cache Coherence Problem

Caching presents an extra issue when employed in a multiprocessor: cache coherence, which occurs when separate processors cache and update values of the same memory region. Adding caches without addressing the coherence problem complicates the programming model because the programmer must worry about memory views that may be inconsistent. To solve the cache-coherence issue in small-scale shared memory multiprocessors, a smart solution based on the bus connection was devised[4]. The fundamental concept is to enforce the condition that all other copies of a memory location, which may exist in other caches, are invalidated before it is written. As a result, when a memory location is read, the system permits many copies to exist, but only one copy when it is written. A block in the cache, typically 16–128 bytes, is the unit for enforcing coherence.

The bus is essential for implementing snoopy protocols, which are the most common coherence protocols. When a processor requests to write to a shared cache block, a snoopy protocol sends the request across the bus, and any caches that have a copy of the cache block simply invalidate it. Because the memory is always up to date in write-through caches, this is the only change to a conventional cache protocol that is required[5]. Because the most current copy of a data item may be in a cache, write back caches provide an additional complexity. If that's the case, read misses will have to go through the caches and potentially get data from another cache.

Snooping operations are implemented by placing the request on the bus and having all caches read the address and either perform an invalidation or supply data from the cache, depending on

whether the cache uses a write-through or write-back mechanism. When two processors attempt to write at the same time, the bus breaks the tie since all requests must be put on the bus, which can only carry one request at a time[6]. This serialization of all bus requests enforces an ordering on all writes (even those to the same location) and is necessary for preserving coherence. The bus-based connection utilized in small-scale shared memory multiprocessors and the snoopy cache-coherence methods work well together for three reasons. The cache-coherence scheme, for starters, makes the cache functionally transparent, allowing the system to cache both shared and private data without having to change the shared memory programming model. Second, using caches lowers the bus and memory bandwidth requirements, enabling the CPUs to share a single memory and bus. Third, the usage of a bus, which broadcasts all memory requests to all processor-cache modules, makes the snoopy coherence protocols very simple to implement.

Cache coherence's reduced programming complexity, combined with its low implementation cost, led to cache coherence being included in all small-scale, bus-based multiprocessors. Microprocessors have incorporated support for cache coherence and linking small numbers of processors (two to four) inside the microprocessor chip in recent years, lowering the cost of small-scale multiprocessors and boosting their popularity considerably. The snoopy schemes used in small-scale SMPs, however, do not scale[2]. The issue extends beyond the usage of a bus, since every possible memory request must be viewed and snooped by all of the system's caches. As a result, the designers of the early DSM multiprocessors did not try to cache shared data, forcing programmers to cope with lengthy access times for shared data stored in distant memory. The early DSM machines were no simpler to program than message-passing architectures because of this. Furthermore, the lack of cache coherence caused a split between the programming approaches used for small-scale cache coherent multiprocessors and large-scale shared memory architectures without cache coherence. The issue was solved by creating a coherence mechanism that could be easily applied to the DSM architectural approach.

1.3.Cache Coherence Based On Directory

Small-scale bus-based multiprocessors depend on snoopy cache coherence methods, which naturally utilize broadcast. However, such schemes were not the first cache coherence protocols devised. Directory-based protocols have been suggested before the snoopy methods were established. Directory-based methods depend on an additional structure known as the directory, which keeps track of which processors have cached each block in main memory[7]. The first directory schemes assumed a single, monolithic directory, and we use this assumption to explain the basic operation of directory coherence. A coherence protocol may utilize the directory to maintain a consistent picture of memory since it records which caches have copies of each given memory block. The status of each cache block is maintained in the cache, and extra information is stored in the directory for each block to ensure coherence. Each cache block can have three states in a simple cache coherence protocol.

Before enabling a cache block to reach the exclusive state, the protocol invalidates any caches that contain a copy of it, ensuring consistency. A directory protocol differs from a snoopy protocol in that the directory protocol obtains information about which processors are sharing a copy of the data from a known place rather than broadcasting to all processors. In a snoopy system, the directory also helps to serialize writes, much as a bus does. Consider what happens when two processors decide to write to the same block at the same time[8]. When requests serialize on their route to the directory under a directory system, the possible race is avoided. Because one request is processed before the other, the first request will invalidate the data of the other processor. After discussing an essential improvement, we'll go at the specifics of a directory protocol.

1.4.Protocols for Distributed Directory Access

The directory notion is used in cache-coherent DSM systems, but the directory is distributed in the same way as memory is spread. A memory location's directory information is stored in the directory associated with the memory that contains the location. The structure of a typical cache-coherent DSM multiprocessor[9]. Although the extension of the directory protocol to a distributed directory implementation is theoretically straightforward, the implementation is complicated by the fact that few of the protocol operations are atomic. Rather, the protocol is carried out by sending messages to:

- The local node, which is the requesting processor node;
- The home node, which has the address of the block that the local node wishes to read or write;
- A potential third node, known as the owner or distant node, which holds the cache block in the exclusive state.

We began investigating the concepts that led to DASH in the late 1980s on the basis of two assumptions. To begin with, shared memory machines would be simpler to build than message-passing machines since shared memory enabled programmers to exchange data structures in a variety of ways at various granularities. Second, cache coherence is essential for caching shared data in complicated applications. This second belief did not come easy to us. In fact, we began our research with the aim of having the compiler enforce coherence[10]. After much research, we came to the conclusion that the compiler would be unlikely to handle the coherence issue effectively across a broad variety of applications. While considerable progress has been made for well-organized scientific issues, effective software coherence for more dynamically structured applications or systems software is still a work in progress. As part of the DASH project, we included a substantial applications effort to test these assumptions. Our experience creating the SPLASH apps has backed up our theories, although in unanticipated ways.

First, we discovered that getting the best performance frequently required meticulous planning of distant data requests, even down to understanding the effect of cache line size. However, we discovered that the coherence methods often assisted in exploiting locality with little additional effort, and that when careful attention was required, the effort was frequently concentrated on a tiny kernel of the program[9]. We also discovered that, even when employing dynamic solutions methods, leveraging the natural locality of scientific issues was sometimes surprisingly simple. The greatest example is the n-body applications: the modeled system has inherent locality owing to underlying physical processes, but utilizing that locality needs fine-grain and time-varying communication. This is the sort of situation where the benefits of a cache-coherent shared address space are most apparent. As a side note, we often discovered constraints in many areas while expanding programs, including load balancing, restricted parallelism, synchronization, and data locality. Overall, we discovered that scaling up programs to utilize additional processors is more challenging than it seems.

Without this support, a single word is the natural unit of access for a load or store, which is very wasteful. To overcome this inefficiency and access several words without cache coherence, the compiler or programmer must ensure that obtaining a block of data rather than a single word is functionally valid. We think that the ability to buffer distant memory accesses in a functionally transparent manner is critical to designing shared memory machines in a way that is efficient in terms of both speed and programmer time.

1.5.Scaling Directory Structures Efficiently

Despite the fact that distributed directories theoretically alleviate the scaling issues that snoopy-based schemes have, DASH's original implementation utilized a non-scalable version of directories. DASH, in particular, utilized a bit vector with one bit per node. A 16-bit vector may

accommodate up to 64 processors since each node has four processors[10]. Aside from the technical challenges of dealing with a very broad bit vector for higher processor counts, utilizing a flat bit vector has a fundamental flaw: the amount of directory storage grows quadratic as a function of processor count. In reality, this problem isn't a problem for computers with less than 64 nodes, but it becomes a significant issue for machines with a high number of processors. To prevent inefficient scaling of directory memory, commercial DSM machines employ one of two methods: storing complete directory information only for blocks that are already in a processor cache, or utilizing a sparse representation of the directory information.

DASH employs a directory to keep track of the state of each memory block in a single, unique place, as well as the nodes that hold copies of the memory block in question. The amount of directory memory may be lowered to an amount that increases linearly with the number of processors by spreading the information for each currently cached memory block. Sparse methods decrease directory memory requirements by altering the way sharing information is represented or keeping track of just the blocks that are currently shared. The directory memory for sparse systems grows linearly with the number of processors. These more scalable methods, as compared to the simple bit vector approach, compromise either simplicity or performance, and frequently both.

2. DISCUSSION

There are many advantages of using a programmable controller. First, depending on the number of processors and the application, the controller may implement various scalable coherence protocols, including sophisticated protocols that are not appropriate for hardwired implementation. Second, MAGIC can combine high-performance message-passing protocols with coherence techniques. Third, replacing special-purpose hardware with a programmable processor lowers the number of components while maintaining flexibility that may be utilized for a variety of tasks, such as synchronization. Fourth, a programmable controller may have fault detection, encapsulation, and recovery functionality. Finally, at the heart of the communications route, such a controller may contain performance monitoring code. The main question we're addressing with FLASH is whether we can accomplish these advantages without making unjustifiable performance or cost compromises.

Several prominent bus-based multiprocessor manufacturers have already converted to DSM architectures. Cache-coherent DSM is expected to become the dominant architectural solution for multiprocessors with four or more processors in the near future. Moderate-scale DSM multiprocessors (16–64 processors) are expected to become one of the most significant designs for large-scale commercial computing, according to our research. These computers are capable of great performance, fault containment and recovery, and resource efficiency. The potential performance and functional benefits of a bespoke node against the cost advantages of a commodity two to four processor node will decide whether such multiprocessors are constructed using custom nodes or conventional two to four processor clusters.

3. CONCLUSION

The task of creating cache-coherent DSM has been fascinating. It was driven by a desire to address a problem, similar to previous engineering research initiatives, and has resulted in new knowledge of multiprocessor architecture and parallel software systems. While cache-coherent DSM was initially designed for large-scale parallel multiprocessors, further fast improvements in microprocessor speed, as well as the resulting pressure on memory bandwidth, have led to the conclusion that DSM methods will be utilized for lower numbers of processors.

Economic considerations will also be important in the development of extremely large DSM multiprocessors in the future. The main issue for such computers is whether the market is big

enough to warrant the technical effort required to create coherence mechanisms, interconnect, and operating system support for these massive multiprocessors. The technological problems relating to such multiprocessors seem to be very well known, and a large-scale integrated cache-coherent multiprocessor may be constructed today. Alternatively, using conventional off-the-shelf connectivity, extremely high processor counts may be obtained by connecting DSM nodes with 64 to 128 processors. Although such "clustered" multiprocessors are expected to be less expensive to develop and manufacture, they are likely to provide poorer performance, present major new performance problems, and require new operating system support. Finally, the requirements of applications and the financial resources available to invest in multiprocessors for these applications will likely determine how they are constructed.

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WAYS TO PROVIDE EMPLOYMENT OF THE PEOPLE'S (ON THE EXAMPLE OF THE REPUBLIC OF UZBEKISTAN)

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ABSTRACT

This article describes in detail the directions of employment, the factors of unemployment. The employment and unemployment rate in the Republic of Uzbekistan, the dynamics of their change and employment are analyzed by industry. Proposals have also been developed to ensure employment and reduce unemployment. According to the Ministry of Employment and Labor Relations, today the number of labor migrants working in other countries in our country is 2.6 million. This figure is 7.5% of the total population and 13.6% of the total labor force. Due to the closure of many jobs and difficult living conditions during the pandemic, most labor migrants returned to our country. This has led to rising unemployment and declining incomes.

KEYWORDS: Employment, Labor Resources, Unemployment, Jobs, Labor Migrant, Self-Employment.

INTRODUCTION

Today, reforms and global projects are being implemented in any country to ensure employment. In particular, the International Labor Organization supports the technical, organizational and institutional capacity of countries around the world to ensure sustainable employment.

Among the countries withdrawing from the global pandemic, Uzbekistan is experiencing a decline in unemployment caused by the pandemic in 2020, and existing jobs are being restored. However, employment has not returned to pre-pandemic levels. The main reason for this is related to external migration.

According to the Ministry of Employment and Labor Relations, today the number of labor migrants working in other countries in our country is 2.6 million. This figure is 7.5% of the total population and 13.6% of the total labor force. Due to the closure of many jobs and difficult living conditions during the pandemic, most labor migrants returned to our country. This has led to rising unemployment and declining incomes.

Therefore, at the initiative of the head of our state, consistent measures are being taken to create new jobs by stimulating active entrepreneurship, improving the investment climate and business environment. In particular, the Resolution of the President of the Republic of Uzbekistan dated July 14, 2018 No PP-3856 "On measures to improve and increase the efficiency of work to ensure employment" [1]. In addition, the country is taking effective measures to implement the approved annual programs to ensure employment, improve the mechanisms of employment in vacancies and quotas, the development of effective forms of self-employment.

However, the labor market in the regions is still highly tense, the creation of permanent jobs, employment of young people, women, members of low-income families, especially in rural areas, as well as the regulation of external labor migration remain unresolved. This shows how relevant the topic is and the need for research in this area.

ANALYSIS OF THE LITERATURE

Employment has always been one of the most pressing issues. Especially in the context of the global pandemic, the issue of employment has once again shown to be a global problem and requires more scientific research in this regard. Including:

From foreign scholars, B.D. on solutions to existing problems in providing employment to the population. Breev [2], V.N. on informal employment and its impact on public finances. Salin and V.V. Narbuts [3], E.A. on Statistical Analysis of Employment and Unemployment. Dolgix [4], C. Krittanawong, A. Kumar, Z. Wang, U. Baber, and D.L. on the risk of cardiovascular disease as a result of self-employment and long labor. Bhatt [5], P.Ge, W.Sun and Z.Zhao [6] on the impact of demographic changes on employment [6] and J. Grashuis on the analysis of the duration and competitiveness of self-employment during the COVID-19 pandemic [7]. are conducting research.

Nasimov, D.A. from local scholars [8] to improve the methodological and methodological framework for the introduction of modern forms of employment in the digital economy, M.K. Abdullaev and D.B. Begalova [9] conducted an analysis of employment indicators in our country, S.A. Bozorova [10] described the state of the service sector in increasing the employment of the population, A.B. Irmatova [11] on the problems of women's intellectual labor, A. Tashpulatov [12] and Sh.R. Xolmuminov, B.X. Umurzakov, T.A. The Mahmudovs [13] have been studying the strategic socio-economic importance of reducing the employment of the rural population and their informal employment.

The results of these studies, in addition to their scientifically based proposals, practical recommendations and conclusions, provide a further scientific study of the organizational, economic and institutional aspects of solving the existing problems of employment and statistical analysis. as well as the development of innovative approaches.

RESEARCH METHODOLOGY

In this study, expert evaluation, comparison, comparative analysis and systematic approach, statistical tables and graphs and diagrams, as well as official statistics of the International Labor Organization, the State Statistics Committee of the Republic of Uzbekistan, the Ministry of Employment and Labor Relations and local and foreign scientists. research work has been widely used.

ANALYSIS AND RESULTS

International labor migration is expanding due to the integration of economies and the development of interstate socio-economic, strategic ties, as well as countries with stable or low population growth due to low birth rates (European countries, Russia, South Korea, etc.).

This process benefits every state. That is, if labor migrants contribute to the growth and development of the countries they go to, remittances and the experience they gain will greatly benefit their countries.

However, the management of the migration process, the protection of labor migrants, the regulation of migration and development relations, and international cooperation are among the most complex issues.

In countries with high population growth rates and most developing and underdeveloped countries, there are sufficient employment problems. These include, for example, lack of jobs, low wages, lack of professional skills and knowledge of the workforce.

There are five main causes of unemployment in the economy:

- Other structural changes in the economy associated with the introduction of new technologies;
- Economic downturn leading to a decline in demand for labor resources;
- Public policy, increase in the minimum wage and therefore decrease in demand for labor;
- Seasonal fluctuations in some sectors of the economy;
- Demographic change, ie the growth of the working age population.

Today, practical measures are being taken in our country to ensure employment. These include increasing employment through the full support of entrepreneurship and small business, family entrepreneurship and self-employment, as well as the creation of new jobs through the creation of favorable conditions for their development.

As of January 2021, the population of our country is 34.6 million. 17.5 million of them. in cities and 17.1 mln. one lives in rural areas.

The population density is 77,000 people per square kilometer in the country. However, the distribution of the population varies sharply by region, in particular, in the Republic of Karakalpakstan there are 11.5 thousand people per 1 sq. Km, in Andijan - 741.4 thousand, in Bukhara - 48.4 thousand, in Jizzakh - 66.5 thousand, in Kashkadarya - 116.7 thousand. 9.1 thousand in Navoi, 385.4 thousand in Namangan, 235.4 thousand in Samarkand, 133.4 thousand in Surkhandarya, 201.2 thousand in Syrdarya, 196.3 thousand in Tashkent, 565.1 thousand in Fergana, 312.9 thousand in Khorezm and in Tashkent. and 7874.1 thousand people. This indicates the strength of internal labor migration across regions with different levels of socio-economic development.

According to the analysis, the number of labor resources in the country is 19.1 million. people, which is 55.9 percent of the permanent population. Of the total labor resources, 19.01 mln. 0.9 million people, or 99.5% of the working age population. or 0.5 percent of workers younger and older than working age (Table 1).

TABLE 1 DYNAMICS OF LABOR FORCE STRUCTURE IN THE REPUBLIC OF UZBEKISTAN (THOUSAND PEOPLE)

Structure of labor resources	**2004**	**2008**	**2012**	**2016**	**2020**
Labor resources	14048,8	15685,7	17564,3	18488,9	19142,3
as a percentage of the permanent population	54,3	57,5	59,0	58,1	55,9
including:					
Able-bodied population of working age	13880,4	15474,6	17451,5	18371,7	19052,0
as a percentage of the permanent population	53,7	56,7	58,6	57,7	55,7
as a percentage of labor resources	98,8	98,7	99,4	99,4	99,5
Workers younger and older than working age	168,4	211,1	112,8	117,2	95,1
as a percentage of the permanent population	0,6	0,8	0,4	0,4	0,3
as a percentage of labor resources	1,2	1,3	0,6	0,6	0,5

Source: Data of the State Statistics Committee of the Republic of Uzbekistan.

77.3% or 14.8 mln. one of them is the economically active population. In addition, 13.2 mln. people or 69.2% of the labor force are employed in the economy.

According to the analysis, by 2020, the employed population will reach 3.6 million. or 26.9 percent in agriculture, forestry and fisheries, 1.8 million. or 13.5 percent in industry, 1.3 million. or 9.6 percent construction, 1.4 million. or 10.3 percent of sales, 0.6 million. or 4.7 percent of transportation and storage, 1.1 million. or 8.8 percent education, 0.7 million. health care and social services, or 4.9 percent. or 21.3 percent of other activities (Figure 1).

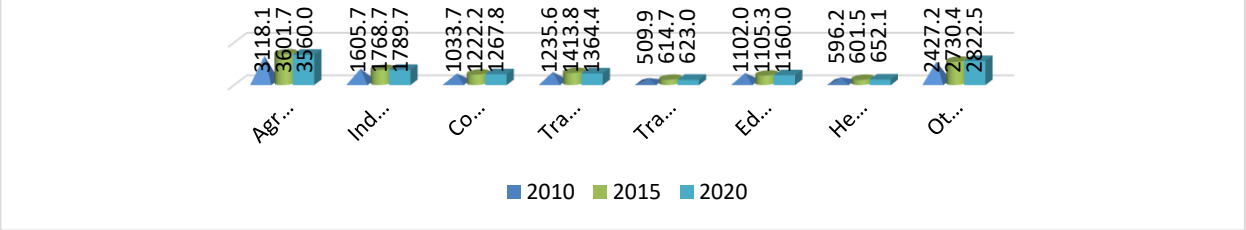

Figure 1. Structure of the employed population by type of economic activity (thousand people).

Source: Data of the State Statistics Committee of the Republic of Uzbekistan.

The analysis shows that in 2020, the employment rate increased by 113.9% compared to 2010 and 101.4% compared to 2015, while by type of economic activity, agriculture, forestry and fisheries increased by 114.2% and 98.8%, respectively, industry 111.5 and 101.2 percent, construction 122.6 and 103.7 percent, trade 110.4 and 96.5 percent, transportation and storage 122.2 and 101.4 percent, education 105.3 and 104.9 percent, respectively. , health and social services by 109.4 and 108.4 percent, and other activities by 116.3 and 103.4 percent, respectively.

Also, according to the analysis of the types of ownership of the employed population, in 2020 the number of employed in the public sector will reach 2.5 million. and 10.7 million in the private sector. formed a person. In recent years, the number of people employed in the public sector is increasing. In particular, the growth rate of banking in the public sector in 2012 (compared to 2010) was 98.0%, in 2014 (compared to 2012) was 98.4%, in 2016 (compared to 2014) was 100.2%, in 2018 (compared to 2016) 104.1 percent, an increase of 102.9 percent in 2020 (compared to 2018).

As of January 2021, the number of registered unemployed in the country amounted to 37.1 thousand people. Compared to 2010, this figure increased by almost 2.3 times, its growth rate was 0.4% in 2000, 0.4% in 2004, 4.9% in 2008, 4.9% in 2012 and 5.2% in 2016. and 110.5 percent in 2020 (Figure 3).

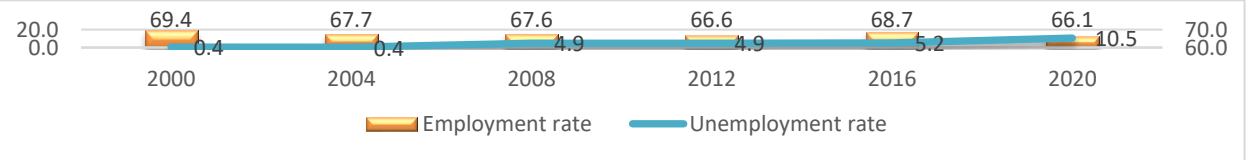

Figure 3. Rate of employment and unemployment (percentage).

Source: Data of the State Statistics Committee of the Republic of Uzbekistan.

The employment rate in the country compared to the working age population in 2000-2020 averaged 67.7%. In particular, it was 69.4 percent in 2000, 67.7 percent in 2004, 67.6 percent in 2008, 66.6 percent in 2012, 68.7 percent in 2016, and 66.1 percent in 2020.

CONCLUSIONS AND SUGGESTIONS

Based on the above, it is expedient to take into account the following in order to ensure employment and reduce unemployment in our country:

1. It is necessary to thoroughly analyze the problems of increasing employment from the bottom up and develop practical solutions and monitor their implementation.
2. In general, the shadow economy plays an important role in reducing unemployment. Therefore, the fight against the shadow economy should be organized not through bureaucratic means, but through the application of economic incentives.
3. In parallel with the demographic changes of the population, it is necessary to create new jobs and use the experience of developed countries in this regard.
4. In the process of digitization of the economy, the resulting unemployment rate will be higher than for emerging professions. Therefore, it is necessary to increase the number of low-skilled jobs in the public and private sectors, in particular, to further encourage self-employment.
5. Today, the database on vacancies is based on a number of online platforms among the non-governmental sectors. However, there is very little information on vacancies on public sector websites and most recruitment processes are closed and narrow. This has a negative impact not only on employment, but also on the productivity of these agencies. Therefore, it is necessary to create a single online platform with complete information on vacancies in the public and private sectors.
6. It is necessary to expand the activities of state and non-state agencies and strengthen control over those in need of social protection and those who have difficulty finding employment.

In conclusion, it should be noted that, first of all, it is necessary to provide the population with real and correct treatment. This will serve to increase the effectiveness of the results of analysis and research on population change and employment. It will also allow for the real development of promising strategies to ensure employment, reduce unemployment and improve living conditions. In general, the use of decent wage rates in the creation of new jobs not only has a positive impact on labor productivity, but also leads to an increase in socio-economic development.

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ESTABLISHMENT OF A NEW LEGAL SYSTEM IN THE FIELD OF PHYSICAL CULTURE AND SPORTS IN UZBEKISTAN IN 2017-2020

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ABSTRACT

This article discusses the adoption of a number of legal and regulatory documents in the last four years on the current priority of comprehensive development of the country through physical culture and sports during the years of independence of the Republic of Uzbekistan. The goals are analyzed and revealed in depth.The contribution of the first President of the Republic I. Karimov in this direction is enormous. "The culture of personal care should be instilled in young people through school, community, health care, physical education and sports" 'vati is noteworthy.

KEYWORDS: *New Uzbekistan", "Action Strategy", Physical Culture And Sports, Healthy Generation, Mass Sports, "Umid Nihollari", "Barkamol Avlod", "Universiade", Olympics, Healthy Lifestyle, Sports Selection, 5 Important Initiatives.*

INTRODUCTION

In the first years of independence, the country underwent serious reforms in economic, political and cultural processes, and new directions of historical significance in the field of physical culture and sports emerged. Improving the health of the population, educating the physical fitness of schoolchildren and students, improving the skills of talented athletes in accordance with modern requirements and international standards, as well as increasing the working capacity and productivity of the working population, intellectuals and, most importantly, prolonging life through a healthy lifestyle. , special attention will be paid to the upbringing of a healthy generation.

The contribution of the first President of the Republic I. Karimov in this direction is enormous. "The culture of personal care should be instilled in young people through school, community, health care, physical education and sports" 'vati is noteworthy.

At the initiative of the republic's sports organizations and associations, the former Soviet Union was one of the first republics to adopt the Law on Physical Culture and Sports in January 1992, which was revised in May 2000 and re-adopted by the Oliy Majlis in a new edition (Mirziyoyev:2019,P.36). In addition to guaranteeing the status of the physical culture and sports movement, the law imposes enormous tasks and responsibilities on governmental and non-

governmental organizations, public organizations, especially sports organizations, associations, ministries with educational institutions.

Taking into account the socio-educational, cultural and historical significance of physical culture, sports, travel (tourism) and national games, serious efforts have been made to promote them, build new sports facilities and create the necessary conditions. Special attention was paid to the national games in the development of physical culture and sports, football, wrestling, tennis and other sports in all segments and categories of the population. In this regard, a number of decisions of the Cabinet of Ministers of the Republic of Uzbekistan aimed at the development of football, wrestling and other sports are important(Karimov:1992, p.69-70).

The resolution of the Government of the Republic "On measures for the further development of physical culture and sports in Uzbekistan" has historically had a special place as a basic program of the movement of physical culture and sports (Karimov:1994,p.30).

It should be noted that in all types of educational institutions, physical education is taught as a subject on the basis of the state education system. In addition to classes, there are sports clubs, various sports competitions, on the basis of which it is clear that the content and essence of physical fitness is a priority in professional training. For this reason, prestigious multi-level sports competitions such as "Umid Nihollari", "Barkamol Avlod", "Universiada", which are directly related to the continuity of education, have become a tradition. One of the most important aspects is that the Presidential Decrees and government decisions related to the development of children's sports are important for the promotion of sports among schoolchildren, the selection of talented children, testing, educating them to become mature athletes. tibor is growing. Their specific goal is to protect the honor of our country at international sports competitions in the future, to take it to greater heights (Nazirov:2020,p.78-82).

Today, the competition between the countries of the world, the demonstration of strength is reflected in the demonstration of sports and intellectual potential. As the first President of the Republic of Uzbekistan IA Karimov said: “Sport is an ambassador of peace. Our goal is also peace, tranquility and, on this basis, cooperation with the people of the world.

Nothing can make a country as world-famous as a sport ” (Nazirov:1992). Indeed, the international prestige of Uzbekistan is growing for the successful participation of Uzbek athletes in the Central Asian and Asian Games, various international tournaments, world championships and the Olympic Games. These achievements in sports will help our people to develop a sense of identity, solidarity and patriotism.

MATERIALS ANDMETHODS

- The last four years in the Republic of Uzbekistan have been a period of radical changes and rapid development in terms of quality for our country and our people. All regions of the country have become an unprecedented construction site - modern enterprises based on the latest technologies, beautiful, well-equipped housing, wide and smooth streets are being built.
- The life of our people is radically improving, human rights and freedoms, the rule of law and social justice are being established. He introduced the term "New Uzbekistan" to the world in recognition of the fact that our country is changing for the better as a result of these changes and innovations. ” ("On Physical Culture and Sports":2000). Over the past four years, the implementation of specific programs in the field of physical culture and sports to strengthen the health of the population, the wide involvement of young people in sports, the national team of skilled athletes who provide high results in sports. In order to form national teams and create additional conditions for coaches, to form a comprehensively mature and

physically healthy generation with a high culture in the country, the following new measures in the field of physical culture and sports have been developed over the past four years. half normative legal acts were adopted, including:

Decree of the President of the Republic of Uzbekistan No. PF-4947 of April 7, 2017 "On the Action Strategy for the five priority areas of development of the Republic of Uzbekistan for 2017-2021",

Resolution of the President of the Republic of Uzbekistan dated June 3, 2017 No PQ-3031 "On measures to further develop physical culture and mass sports",

Resolution of the President of the Republic of Uzbekistan dated August 10, 2017 No PP-3197 "On measures to further improve the activities of the Uzbek State University of Physical Culture and Sports",

Decree of the President of the Republic of Uzbekistan No. PF-5368 of March 5, 2018 "On measures to radically improve the system of public administration in the field of physical culture and sports",

Resolution of the President of the Republic of Uzbekistan dated March 5, 2018 No PP-3583 "On the organization of the Ministry of Physical Culture and Sports of the Republic of Uzbekistan",

Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated October 25, 2018 No 864 "On further improving the system of national sports competitions among schoolchildren and students",

Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated February 13, 2019 No 118 "On approval of the Concept of development of physical culture and mass sports in the Republic of Uzbekistan for 2019-2023",

Decree of the President of the Republic of Uzbekistan No. PF-5924 of January 24, 2020 "On measures to further improve and popularize physical culture and sports in the Republic of Uzbekistan",

The CONCEPT "Development of physical culture and sports in the Republic of Uzbekistan until 2025" was adopted.

RESULTS AND DISCUSSION

Adoption of the above-mentioned new normative legal acts in the field of physical culture and sports and their implementation will ensure that all segments of the population, especially the younger generation, are regularly involved in physical culture and sports. to create conditions, to strengthen the confidence of young people in sports with their will, strength and capabilities, to develop courage, patriotism, devotion to the motherland, to represent our country at the Olympic Games, World Championships, Asian Games and Achieving high results in championships and other prestigious international competitions, the implementation of large-scale work aimed at further enhancing the image of Uzbekistan in the world, the further development of physical culture and sports, opens the door to great opportunities for every citizen of our country (Resolution of the Cabinet of Ministers of the Republic of Uzbekistan:1996).

In conclusion, it should be noted that today in "New Uzbekistan" the attention paid to physical culture and sports, the conditions created for the regular participation of our youth in physical culture and sports, all this is the spiritual maturity of our youth. It helps them to grow up physically healthy, not to succumb to various foreign ideas, and to raise the Uzbek flag in the world. In his speech at the solemn ceremony dedicated to the 29th anniversary of state independence of the Republic of Uzbekistan, President Shavkat Mirziyoyev noted that the foundations of a new revival - the Third Renaissance - are being laid in Uzbekistan at a time

when the glorious power of our people is in full swing. The fact that the Third Renaissance in Uzbekistan was also aimed at improving physical culture and sports was explained by the fact that the aim was to increase this "vitality".

It is no coincidence that President Shavkat Mirziyoyev emphasized that “we will continue to attach great importance to the rapid development of sports, encouragement and support of athletes who have achieved high results in international competitions” (Resolution of the Cabinet of Ministers of the Republic of Uzbekistan:1999).

On March 19, 2019, the President of the Republic of Uzbekistan Sh. Mirziyoyev put forward 5 important initiatives to launch work in the social, spiritual and educational spheres in the country on the basis of a new system. the practical proof of this is that it is aimed at creating the necessary conditions for them to demonstrate their abilities in the field of sports. This is the basis for a healthy lifestyle in society - physical activity, exercise, regular sports.

CONCLUSION

There is no doubt that the athletes of "New Uzbekistan" will make a worthy contribution to laying the foundation for the Third Renaissance in our country indicates.

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THE MEANING AND METHODS OF DETERMINING THE COMPOSITION OF THE HUMAN BODY

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ABSTRACT

This article provides information on modern research on the methodology of studying the compositional composition of the human body. The study of the composition of the human body is becoming increasingly important in medical practice and sports. Determination of body composition in clinical medicine is relevant for the diagnosis and prognosis of diseases. Various methods are successfully used in many fields of medicine - resuscitation and intensive care, cardiology and surgery. In sports medicine, the determination of the body composition of athletes is a way to control the physical activity of athletes, allowing them to effectively manage the training process. It has been proven that body composition is an indicator of a person's physical activity, his adaptation to environmental conditions, as well as his interaction with professional and sports activities.

KEYWORDS: *Sports Medicine, Determination Of Human Physique, Correlation Of Body Structure, Athletes.*

INTRODUCTION

First of all, knowledge of body composition allows us to assess the physical development of a person, which can be especially useful in pediatrics. In nutrition, the determination of the fatty component of the human body is used in the treatment of obese patients [4]. Identification of water sectors in the body in intensive care and intensive care for the control and planning of infusion therapy, in therapeutic practice - the choice of drugs, assessment of the development of metabolic syndrome, in cardiology and surgery - to determine the level of hydration, in urology - to determine urodynamics [5]. The study of body composition - bone mass - is of great importance for the prevention, diagnosis and evaluation of the effectiveness of treatment of osteoporosis.

The study of body composition in sports allows you to control the health of athletes, is a method of monitoring physical performance, allows you to effectively manage the training process, as well as control dietary loads [2], functional indicators [2, 6]. Dynamic studies of body mass components have been carried out by many scientists in different directions. It is known that

body composition changes under the influence of the different composition of proteins, fats and carbohydrates in the diet. An increase in the level of fat mass is observed with an increase in the ratio of the carbohydrate-fat complex in the diet; when the amount of fatty and carbohydrate foods is limited, adverse changes in body composition are noted [4].

A direct relationship has been established between indicators of body composition and the level of physical activity [7]. Intense physical activity leads to a decrease in the fat content and an increase in active body weight [1]. Body composition is greatly improved. This is especially important for the healthy growth and athletic performance of athletes, even at low levels with 9 or more hours of training per week. Studies have confirmed that the values of body mass components are associated with the manifestation of various physical qualities and the development of functional systems of the body: with indicators of strength, speed and flexibility - with individual aspects of training and integral ones. Indicator - ensuring physical activity with a certain physical capacity for work and direct or indirect sports results: aerobic and anaerobic indicators. Several studies have shown the crucial role of muscle volume in shaping the response of the cardiovascular system to physical activity.

The specificity of the values of body mass components is also determined by the types and qualifications of athletes. High level athletes have more muscle mass and less fat mass than less experienced athletes. Athletes involved in strong sports are characterized by the maximum values of muscle mass, endurance sports - by low muscle mass; and minimum fat content; For athletes involved in sports, intraspecific differentiation of the values of muscle and fat mass by role play is characteristic. Thus, in each sport, a unique morphological model of athletes is formed, the adherence to which is the main advantage of success and longevity in sports. The incompatibility of the model with the athlete's high motivation requires high activity of additional compensation mechanisms, which ultimately allows to achieve high results, reduces the likelihood of longevity in sports, is also a health risk factor and requires the strictest current control over the processes. ... Adaptation of the athlete's body to training influences. Today, the requirements for athletes are steadily growing, athletes can meet more and more complex criteria of the morphological model, change their physical data from general morphological norms in order to ensure optimal implementation of the biomechanical stereotype of sports, etc. They must apply specialized teaching methods. One of the most pressing challenges for athletes is new ways to maintain optimal body weight, lose weight, or maintain low body weight. Deliberately maintaining a low body weight or short-term weight loss can lead to serious health problems. All of this is becoming a common issue in many sports. An important step towards maintaining the health and performance of athletes has been the change in the rules and capabilities for determining the body composition of athletes, which today has become more accurate. and reliable. Calculation of fat mass, which is a metabolically active organ, is of great importance in sports, and its adequate level plays an important role in maintaining overall health [8]. Knowing the amount and distribution of muscle mass (bone and muscle) can be important in determining athletic performance. Fat during the competition It is undesirable to reduce the proportion of mass by 5-6%, and the mass of the musculoskeletal system - by 46%, which often indicates fatigue of athletes. In addition, changes in muscle and fat components under the influence of physical exertion reflect the direction and severity of flexion shifts at the structural level in the athlete's body and the predominance of energy supply, therefore, the labile morphological parameters of a person are markers. ... Adaptation to intense muscle activity. Controlling the water balance of athletes is not important in sports, because dehydration is difficult for the body, even if it is minor. Vigorous physical activity is accompanied by the loss of micronutrients, primarily sodium and potassium, as a result of sweating. Negatively affects the functional state of the cardiovascular system and neuromuscular regulation. Studies have shown that it is necessary to control the total water level in the body, the volume of intracellular fluid in elite

athletes when adjusting body weight before the start of the race, in order to prevent a decrease in strength.

In the last century, many methods were proposed for determining the composition of the human body, and today modern approaches allow us to study the structure of a biological system at all levels - elementary, molecular, cellular, and bodily. At the level of organ-tissue and the whole organism [4]. However, they all have their drawbacks, and currently there is no universally appropriate criteria or "gold standard" method for determining body composition. All methods used are divided into the following categories: reference methods, laboratory and field.

Guiding techniques include multicomponent models, computed tomography and magnetic resonance imaging. Laboratory methods: dual energy X-ray absorption, densitometry, hydrometry, ultrasound, 3D scanning. Field methods - anthropometry, bioimpedance, and body mass index [2].

Traditionally, two-, three-, four-component and five-level multi-component models are used. However, composite models (body density, body water, mineral body mass, total body protein mass) to estimate body composition require a lot of time and expensive special technology to measure the parameters. Cell mass). An example of a method for studying body structure based on an assessment of body density is hydrostatic densitometry. For this, body weight is measured in water and under normal conditions. The need for complete immersion of the body for measuring body weight reduces the possibility of using the method in children, as well as in the elderly and sick people. An alternative method for checking body density is air plethysmography. In general, there are technical difficulties in the implementation of hydrostatic densitometry and air plethysmography, stationary. There is also the problem of limiting their use at the individual level due to significant individual differences in the density of available lean body mass. Therefore, in the absence of data on the composition of lean body mass, these methods can only serve to describe significant changes in fat mass [5].

The reference methods for determining body composition at the tissue level are magnetic resonance imaging and computed tomography. X-ray computed tomography allows you to separately monitor the amount of subcutaneous and internal fat, as well as the mass of skeletal muscles and internal organs. Magnetic resonance imaging can be used as a reference method for determining skeletal muscle mass, as well as computed tomography. The advantage of the methods is their high accuracy and precision. The disadvantages are the high cost of research, the use of a source of radioactive radiation, the lack of regulatory criteria, the need for stationary research [4]. The most common method for determining body composition is dual-energy X-ray absorptiometry (DXA). Initially, this method was successfully used in medical practice for the diagnosis of osteopenia and osteoporosis. Currently, in addition to assessing mineral density, bone mineral mass, DXA is used to determine fat. The DXA method allows you to examine both the peripheral and axial parts of the skeleton. Built-in software automatically adjusts measurement results based on soft tissue density, is minimally invasive and does not require active patient involvement, and is relatively inexpensive. Analysis of the results of neutron activation using DXA, comparison with hydrostatic densitometry, showed the possibility of a fairly accurate assessment of BMI and lean body mass. Based on this, the DXA method is sometimes used to measure body mass index, as well as caliperometry and bioimpedance. used as a reference for validating prediction formulas based on etiology.

Bioimpedance analysis is based on significant differences in adipose tissue permeability and lean body mass. This method is characterized by optimal accuracy, mobility, relative cheapness of equipment and control, simplicity of the research process, simplicity of automatic data processing, complicates comparison and analysis. The advantage of individual models of this method is the simultaneous assessment of clinically important parameters, such as active cell

mass and basal metabolism, as well as the possibility of studying not only integral, but also local parameters of body composition [5].

One of the highly accurate methods for determining fat, muscle and other tissues today is the ultrasound method for checking body composition. Portable ultrasound devices allow research in this area [2]. Undoubtedly, the introduction of new technologies and research methods will increase the reliability and efficiency of the composition assessment. However, as already noted, new methods are expensive, the need to standardize their methods for practical application, as well as the development of normative indicators, is urgent. Anthropometric and calipometric methods for determining body composition have proven themselves well in sports and medical practice. The cheapest, easiest and most portable bodybuilding method in the field. However, conducting an anthropometric study requires a high qualification of the researcher and strict adherence to the examination protocol.

Among the field methods for studying body composition, body mass indices occupy a certain place. Unfortunately, the use of indicators of height and weight does not provide reliable information about the structure of the human body. The low content of the data of this method was determined to determine the fat mass in people of athletic constitution, whose activity was associated with physical labor or active physical training, which led to an increase in muscle mass [9]. Thus, the choice of a method for determining body composition largely depends on the intended purpose of the study and the availability of technology. Undoubtedly, when studying the population and in the outpatient practice of sports medicine, preference is given to relatively simple, portable and inexpensive methods - anthropometry, calipometry, bioimpedance analysis. The requirement for high resolution of the method is of great importance in scientific and clinical research.

In conclusion, we can say that in many respects the choice of a method for determining body composition depends on the purpose of the study and the availability of technology. Undoubtedly, in population studies and in outpatient sports medicine, preference is given to relatively simple, portable and inexpensive methods - anthropometry, calipometry and bioimpedance analysis. The requirement for high accuracy of this method is of great importance in scientific and clinical research. Of course, the introduction of new technologies and research methods can increase the reliability and efficiency of body composition assessment. However, as mentioned above, the importance of new methods, as well as the standardization of methods for their practical application, also requires the development of normative indicators.

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SECURITY ASPECTS RELATED CACHE MEMORIES IN THE SYSTEM FILES

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ABSTRACT

In memory-related applications such as smart cards and biometric solutions, cache memory security is a significant concern. The goal of this study is to examine different cache memory vulnerabilities and provide countermeasures to prevent such attacks and ensure cache memory security. The information saved in cache memory may be retrieved at any time. The invader is at risk of gaining access to this information. According to statistical analysis, techniques such as side channel attacks, timing attacks, and power-based assaults are used to test the security of information in caches. Using methods such as code convertors, layered XOR operations, extended Hamming codes, and multi-bit clustered ECC, solutions such as secure cryptography-based algorithms, secure aware cache mapping, and low power cache architecture are discussed. The improvement and authentication of cache memory security will result in a variety of applications including smart cards and biometric applications where data secrecy is critical.

KEYWORDS: *Cache Memory, Power Based Attacks, Side Channel Attack, Timing Attacks.*

1. INTRODUCTION

Between the central processing unit and the main memory unit is a cache, which is a tiny and restricted memory. The cache is physically and logically closer to the main memory. Caches are divided into three levels: Level 1, Level 2, and Level 3. Each level is created and incorporated according to the requirements. There are two types of address fields in cache lines and blocks: dynamic (tag) and static (name) (index). The tag stores the upper address bits, whereas the index stores the lower address bits[1]. Lower order address bits are fixed, whereas higher order bits may be changed. Before being used, the contents of the cache are cleared. Memory in the cache is divided into parts.

When a certain piece of information has to be found, the central processing unit looks in the cache memory to see if it's there; if it is, it's called a cache hit; if it's not, it's called a cache miss. Hit latency and miss latency are terms used to describe the delays that occur in such situations. Various cache mapping methods are investigated. Caches are divided into two categories: data cache and instruction cache. High speed, low latency, quicker information retrieval, and quick

data access are just a few of the benefits of cache memory. When building cache memory, power consumption and space are also significant considerations.

1.1. Cache Memory Security Concerns

Covert channel is a basic notion of crypt analysis side channel attacks, and cache storage attacks deal with it. In embedded systems, a novel storage channel probing cache debug capability is used[2]. Interlock, threshold, and ordering methods are all used in storage channels. The state of variables, on or off, is used by the author to represent numbers and characters. The covert channel and the side channel cross paths. Micro architecture entails the use of software characteristics in the development of cryptographic systems for data transmission. For privilege bits, a new covert channel offers data cache filling per line. Covert channels, it has been discovered, do not use heuristic timings.

Internal and external interruptions of a group of words to be put into cache memory are handled by Cubic based set associative cache encoded mapping[3]. Processor speed is influenced by factors such as cache size hit and write policies, cache map methods, and cache depth level. With the cubic set associative method, set associate mapping remaps. Hash functions may be a good option. It is investigated the temporal and spatial location of reference. The goal is to investigate new associative mapping's temporal convolution. Physical memory is referred to as associative memory. Attributes include tag, block, and word. The process of creating a cubic cache map entails remapping the real reference with a standard scheme in a linear pattern. In this regard, Graceful Code (GC) is a likely case study. The need for a cutting-edge memory testing methodology is urgent.

Cubic one-to-one recursive mapping is an extension of unique one-to-one mapping. These technologies provide opportunities to improve cache design and protect against assaults. Side channel attempts to extract encrypted keys by software operations target cache-like architectures utilizing Instruction Cache and Data Cache, and therefore effective protection is lacking[4]. The author uses software random permutation to preload information. There is a tradeoff between hardware complexity and performance overhead. Information leaking is prevented by using a branch target buffer and an update policy. Power, heat, and electromagnetic radiation are all targets of the side channel. Instruction Cache is a component of shared architecture. Access-driven and time-driven software assaults aren't impossible to imagine.

AES and RSA are utilized as part of a software permutation technique. The square matrix multiply method is used in modular exponentiation. Branch Target Buffer (BTB) and other conditional branches should be avoided. Secret keys are required for instruction cache attacks. Protection methods against data cache assaults are brought about by combining software and hardware. All essential data is directed into cache by the exception handler. Set associative mapping based on cache controller is used to design cache memory using cache controller[5]. The reference point's spatial position is utilized. The cache miss ratio is investigated using the method. In relation to parallel accelerator processors, work is being done on four-way set associative mapping. In semi-conductor memory, they are accessible via a common L1 cache. It's utilized in embedded systems for power efficiency and excellent performance. They may be used in FPGA-based CPUs.

Cache controllers provide address range to microprocessors, which substitutes address range in cache tag memory. When side channel assaults are prevalent, the security of a secure cache architecture is manipulated. Dynamic memory is used for cache re-mapping based on eviction randomization in the new-cache method [6]. Better results may be obtained by tweaking the replacement algorithm slightly. Secret keys may be discovered via address memory exploitation. Various assaults must be kept an eye on. Prime and probe attacks have the potential to fill the whole cache area with bad material. In this case, a spy procedure that involves counting cache

hits will be effective. The Evict and Time attacks are used to determine the length of time it takes to encrypt data. Bernstein is the one who launched this assault. MTD (Moving Target Design) and LDM (Large Direct Map) are two options.

For the new cache, attacks have been altered. The algorithm for replacement may be improved. The new cache is ineffective against eviction and time attacks. The new cache must be enhanced. Remove the protected bit (P bit) from the tag array and place it in the index field. Randomization has been completed. On mobile devices, time-based cache attacks are common. These are involved in mobile devices that employ cache memory to protect and secure users' data. On Android mobiles, a T-table based AES implementation is tested. Applications linked to Bernstein's assault are being investigated as part of a time-driven attack investigation[7]. This kind has two phases: research and attack. The correlation step entails a lengthy key search. Time-based cache attacks are mitigated by using an algorithm that reduces key space.

Wide collisions are used to investigate energy leakage. The cache-coloring based technique for reducing leakage energy in multi-tasking systems deals with energy efficiency as a major issue. The amount of energy that leaks out of caches is constantly checked. An energy-saving algorithm has been developed and deployed. A comparison is made between the model and the Decay Cache Technique (DCT). The presence of an on-chip cache increases energy consumption, which is a critical factor. It's possible to see dynamic profiling with dynamic cache reconfiguration for the best memory subsystem for energy efficiency. Improving memory encryption performance in multi-processor systems8 takes into account the most trusted chip, which is susceptible to physical assaults.

Outside the chip, security methods like as confidentiality and integrity are critical. Unipolar encryption techniques that use xor padding are mathematical counter mode encryption methods. For better data protection in caches, One Time Password is recommended. By using the coherence protocol, a good method for counter cache coherence protocol improves the pace of hits put on counter cache while cooperating with transit cache. As previously mentioned, such techniques improve the overall performance of cache memory structures.

When side channel leaking information is detected, theoretical use of cache memory on a side channel based on crypt analysis is a possible solution[8]. Plain text encryption leaves up the possibility of data hacking. To hide hidden data in memory devices, methods of calculating power based on techniques such as basic and differential power analysis may be used. Timing attacks, electromagnetic radiation assaults, glitch and fault analysis-based attacks are some of the other side channel attacks. There is a risk of a cache memory attack on main memory. Important factors include cache hits, cache misses, and cache size. To prevent data theft, the cache must be turned off when the power is turned off.

Microprocessors have a lot of moving parts in their design. For big level 2 and level 3 caches, a new idea in cache designs offers minimal area over-head for error prevention. Different schemes are used in the architecture. The first method, which was devised as part of an error repair and protection protocol, entails filthy cache lines. For protection, cache lines are cleansed and a parity check is performed. The second strategy involves clearing filthy caches on a regular basis and writing the information to main memory without raising traffic. The general behavior of cache lines is kept track of. Cache lines that are dirty are decreased by almost half. Attacks are given with new cache designs that are simple to execute on a variety of systems[9]. This procedure does not need the use of any specific equipment. Furthermore, no additional processing power is needed.

A simple time measurement may be used to retrieve the secret key. In this study, two fundamental mitigating methods are observed. The first phase of research focuses on partitioning, with the goal of eliminating cache memory interference. The second method

ensures that cache interference is randomized. Partition Locked (PL) cache and Randomized Permutation (RP) are two new security-aware cache designs that protect against side channel attacks. The focus of the research is on minimizing cache interference and mitigation, which are the fundamental causes of such assaults. The methods described here offer hardware solutions using a theoretic approach based on mathematical rules.

Cryptographic side-channels obtained from low-power cache memory entails microprocessors concentrating on space and power consumption while ignoring physical security[10]. Power parameters are analyzed using methods such as basic power analysis and differential power analysis. Physical security is a target of side channel attacks, rendering it susceptible. Microarchitecture side channel assaults are the subject of research. A low-power cache memory design has been created. Cache memory with branch prediction based on BTB attacks is a unique kind of cache memory. It's been discovered that the RSA algorithm is vulnerable to a power analysis attack. On the algorithmic and architectural levels, defensive approaches based on the square and multiply methods provide critical answers. The flow inside the square and multiply algorithms is controlled by the use of a non-state low power cache memory maintaining level 1 data cache.

An induced cache miss and countermeasure are shown in this advanced encryption standard power attack. By flushing parts of the S-box from cache, traditional attacks attempt to break data. In the encryption step, a cache miss is generated, and power traces are utilized. It is not necessary to clear the cache before encrypting the data[11]. When the CPU performs AES, the fundamental concept is to force a cache miss. Cache size, block size, and an understanding of associative techniques are all needed in this scenario. Later, they are included into block ciphers. There is no requirement for randomization. Before the actual calculation begins, countermeasures on the insertion of a set of s-boxes in the encryption algorithm are carried out.

Cache security is enhanced by the Intelligent Web Proxy Cache Replacement Algorithm15, which is based on Adaptive Weight Ranking Policy through Dynamic Aging. ICN's Selective Placement of Caches16 for Hash-Based Off-Path Caching provides a superior cache placement method. Cache memory reliability utilizing identical tag bits, power reduction and cell stability based on dynamic isolated read static random success memory, and data scrambling based secured data authentication told in memories are all addressed in depth, providing possible answers. Cache parameter problems may be solved by designing an exclusive cache architecture20 that saves electricity. A potential method to provide cache security is to do a performance analysis21 of cache consistency management in a mobile context utilizing an agent strategy.

1.2. Caching methods are compared in terms of performance.

- Introduces a new storage channel that is based on the cache debugging facility. With cryptanalytic side channel attacks possible, At the time of Difficulty in cache debug facility in embedded microprocessors, the new covert channel method did not depend on heuristic timings.
- Cache depth level is targeted at the time of Cache remap in linear order fashion with set associative mapping remapped using cubic set associative method retaining Spatial and temporal ideas applied with Cache depth level is targeted at the time of Cache remap in linear order fashion[12]. Cache size and hit write policies are important things to consider while using the graceful code approach.
- Preloading information based on Secure Partition Locked cache and Random Permutation cache with Cache-like architectures can retrieve secret keys through software activities in order to create an integrated software and hardware protection

scheme against D cache attacks for a tradeoff between hardware complexity and performance overhead.

- Four-way set and spatial locality of reference are utilized to monitor cache misses. Because of this, associative mapping is utilized. Accessible through a shared L1 cache in the shared memory paradigm, there are security risks. Embedded systems using FPGA processors with low power and high performance face circuit complexity and power consumption challenges.
- Moving Target Design and Logical Direct Mapping methods were used5 to attack Address Memory, with the risk of secret key bits being discovered. Defects in access-driven attacks and failures in evict and time attacks have been improved with a new cache algorithm.
- Security risks to confidentiality and integrity outside the chip are addressed by the counter cache coherence protocol, which is used to improve hit rates on counter caches8. The MESI protocol, which is vulnerable to physical assaults, increased overall performance.
- A Fiestal network structure-based algorithm and a non-deterministic access ordering cache placement method were utilized to a cache-based attack on algorithm implementation in the CPU Attackers are confused by timing skews and fake operations. Algorithm for Cache Behavior Analysis on Hardware Targets
- When a processor executes to the extent of AES depending on cache size, block size S-box accessible in the encryption function before actual computation begins, a cache miss is forced. There is no requirement for randomization. Flushes s-box items from the cache.
- Approaches to mitigation based on partitioning and randomization methods in the direction Simple time measurements can recover key in the cache interference is minimized by mitigation methods that are simple to execute on most systems.

2. DISCUSSION

Size, access time, space occupied, power consumption, latency, and speed are some of the important factors to consider while building cache memory. When cache memory is targeted, it becomes insecure. Creating random vectors is tough. When the power is turned off, there is a risk of secret data being recovered. The selected AES algorithm is susceptible to a D cache attack. The temperature of the data is affected by its coolness. Hacking will become more likely when electromagnetic radiation is emitted. Secure data may be recovered and made insecure using a circuit design replica. Adding circuit complexity to prevent assaults increases design costs. Secure cryptography based algorithms, secure aware cache mapping, and low power cache architecture are among the proposed solutions.

It may be a better idea to change the encryption algorithm's design to use light weight encryption to fit the cache memory implementation. Data hacking may get more difficult as bit length increases. To enhance security, sub-key creation may be generated from the primary key. Data scrambling methods that are intelligent may be properly thought out and executed. Encryption and decryption are improved when code convertors are used. Nested XOR operations and error detection mechanisms, such as Hamming code implementation to identify single bit mistakes, are also worth considering. It is possible to see cache and D cache timing attacks across cache memory. The Sliding Window Exponential method may help to enhance cache security.

Some of the methods include using semantic array partitioning, using hash functions on skewed associative caches, and repeating many identical rounds including replacement, transposition, mixing rows and columns, and shifting them. On the cache, partitioning methods may be investigated. It is possible to estimate time. Also feasible are adaptive security quality controllers, contention-based attacks, reuse-based attacks, and dynamic remapping tables. The

prime and probe attacks, as well as the evict and time attacks, are all seen. It is possible to see supply voltage scaling for core processors and deep nanoscale architectures to decrease system energy usage. Extended hamming codes and multi-bit clustered ECC are two additional options.

3. CONCLUSION

Security of cache memory is a significant concern in memory-related applications such as smart cards and biometric systems, where data confidentiality is critical. To hack the content of integrated circuits, hackers utilize a variety of methods, most of them are based on side channel assaults. The mere knowledge of leaking power allows a hacker to break secret data, which becomes susceptible when subjected to electromagnetic interferences, and therefore the focus of this study is to identify different data assaults and provide countermeasures to ensure data security. Future research may focus on more secure data security methods, particularly for cache memory.

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BETTER QUALITY CLASSIFIERS FOR SOCIAL MEDIA CONTENT: CROWDSOURCING WITH DECISION TREES

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ABSTRACT

A basic task in sentiment analysis is classifying the polarity of a given text at the document, sentence, or feature/aspect level whether the expressed opinion in a document, a sentence or an entity feature/aspect is positive, negative, or neutral. as social media use grows and increasingly becomes a forum for social debate in politics, social issues, sports, and brand sentiment; accurately classifying social media sentiment remains an important computational challenge. Social media posts present numerous challenges for text classification. This paper presents an approach to introduce guided decision trees into the design of a crowdsourcing platform to extract additional data features, reduce task cognitive complexity, and improve the quality of the resulting labeled text corpus. We compare the quality of the proposed approach with off-the-shelf sentiment classifiers and a crowdsourced solution without a decision tree using a tweet sample from the social media firestorm #CancelColbert. We find that the proposed crowdsource with decision tree approach results in a training corpus with higher quality, necessary for effective classification of social media content.

KEYWORDS:*Social Media, Sentiment, Classifier, Machine Learning, Decision Tree, Twitter.*

1. INTRODUCTION

Sentiment analysis (also known as opinion mining or emotion AI) is the use of natural language processing, text analysis, computational linguistics, and biometrics to systematically identify, extract, quantify, and study affective states and subjective information. Sentiment analysis is widely applied to voice of the customer materials such as reviews and survey responses, online and social media, and healthcare materials for applications that range from marketing to customer service to clinical medicine.

Precursors to sentimental analysis include the General Inquirer, which provided hints toward quantifying patterns in text and, separately, psychological research that examined a person's psychological state based on analysis of their verbal behavior. Advanced, "beyond polarity" sentiment classification looks, for instance, at emotional states such as enjoyment, anger, disgust, sadness, fear, and surprise. Subsequently, the method described in a patent by Volcani and Fogel,

looked specifically at sentiment and identified individual words and phrases in text with respect to different emotional scales[1]. A current system based on their work, called Effect Check, presents synonyms that can be used to increase or decrease the level of evoked emotion in each scale.

Many other subsequent efforts were less sophisticated, using a mere polar view of sentiment, from positive to negative, such as work by Turney, and Pang who applied different methods for detecting the polarity of product reviews and movie reviews respectively. This work is at the document level. One can also classify a document's polarity on a multi-way scale, which was attempted by Pang and Snyder among others: Pang and Lee expanded the basic task of classifying a movie review as either positive or negative to predict star ratings on either a 3- or a 4-star scale, while Snyder[8] performed an in-depth analysis of restaurant reviews, predicting ratings for various aspects of the given restaurant, such as the food and atmosphere (on a five-star scale)[2].

First steps to bringing together various approaches—learning, lexical, knowledge-based, etc.—were taken in the 2004 AAAI Spring Symposium where linguists, computer scientists, and other interested researchers first aligned interests and proposed shared tasks and benchmark data sets for the systematic computational research on affect, appeal, subjectivity, and sentiment in text.

Even though in most statistical classification methods, the neutral class is ignored under the assumption that neutral texts lie near the boundary of the binary classifier, several researchers suggest that, as in every polarity problem, three categories must be identified. There are in principle two ways for operating with a neutral class. Either, the algorithm proceeds by first identifying the neutral language, filtering it out and then assessing the rest in terms of positive and negative sentiments, or it builds a three-way classification in one step[3]. This second approach often involves estimating a probability distribution over all categories (e.g. naive Bayes classifiers as implemented by the NLTK). Whether and how to use a neutral class depends on the nature of the data: if the data is clearly clustered into neutral, negative and positive language, it makes sense to filter the neutral language out and focus on the polarity between positive and negative sentiments. If, in contrast, the data are mostly neutral with small deviations towards positive and negative affect, this strategy would make it harder to clearly distinguish between the two poles.

A different method for determining sentiment is the use of a scaling system whereby words commonly associated with having a negative, neutral, or positive sentiment with them are given an associated number on a −10 to +10 scale (most negative up to most positive) or simply from 0 to a positive upper limit such as +4. This makes it possible to adjust the sentiment of a given term relative to its environment (usually on the level of the sentence)[4]. When a piece of unstructured text is analyzed using natural language processing, each concept in the specified environment is given a score based on the way sentiment words relate to the concept and its associated score.

This allows movement to a more sophisticated understanding of sentiment, because it is now possible to adjust the sentiment value of a concept relative to modifications that may surround it. Words, for example, that intensify, relax or negate the sentiment expressed by the concept can affect its score. Alternatively, texts can be given a positive and negative sentiment strength score if the goal is to determine the sentiment in a text rather than the overall polarity and strength of the text. There are various other types of sentiment analysis like- Aspect Based sentiment analysis, Grading sentiment analysis (positive, negative, neutral), Multilingual sentiment analysis and detection of emotions.

Developing automated classifiers for social media content is an important problem for data scientists and privacy researchers. People are increasingly using social media to express opinions

on a wide range of issues spanning politics, social injustice, corporations, sports teams, and more. User's opinions can vary, ranging from support to opposition. Data scientists may apply automated classifiers to these data to understand public sentiment toward certain brands or social issues that are being debated online. Privacy researchers may be interested in using these classifiers to identify specific individuals within those online discussions to target key users or communities for influence interventions[5].

Developing automated classifiers to measure support and opposition is complicated by several factors to include short size of text, sarcasm, humor, political alignment, emoticons, among other factors. We investigate methods to overcome these issues using crowdsourcing and decision trees. Twitter is an online news and social networking service that allows users to post and interact with 280-character messages called "tweets".

As a result, Twitter's rich data can provide insight as to how the general public perceives a topic. With that value realized, a single tweet object can serve as a trove of metadata, including the tweet's content, the location it was sent from, and the time it was sent. Twitter provides a well-documented application programming interface (API) as a way to query Twitter data and fetch results in a standardized format, which can then be parsed for areas of specific interest.

Developing text classifiers for Twitter data using a supervised learning approach requires a gold-standard training dataset to develop and evaluate the veracity of potential classifiers. While there exist several off-the-shelf text classifiers for Twitter data, they may not be tailored to specific applications. We posit that the nature of an online firestorm (large, negative, online discourse) may be fundamentally different than the nature of discourse comprising the off-the-shelf training corpus. Furthermore, the performance of various off-the-shelf classifiers may differ and exhibit varied performance when applied to newly captured data. Finally, we posit that achieving agreement among humans classifying tweets in emotionally charged firestorms is highly problematic due to personal bias and conflation of sentiment, position, humor, sarcasm, and other challenges of assessing micro-blog data.

AMT is an on-demand crowdsourcing marketplace that allows individuals to request work from others online. This marketplace allows people to complete "human intelligence tasks" (HIT)—tasks that humans can currently do more intelligently than computers. It allows requesters to crowdsource data from tasks ranging from object detection in photos to text translation. The requester of the work specifies how many workers can complete a task, determines a monetary value to reward them with, and for the case of sentiment analysis of tweets, asking several workers to provide annotations for each tweet will improve the accuracy of the results. By having multiple annotators assess the tweets provided in the task, there will be random overlap of workers annotating the same tweet.

An important measure of quality in training data is the inter-annotator agreement (IAA). IAA is the level of agreement between raters (annotators), which is high if all raters consistently agree when independently labeling data and low when they disagree. Krippendorff's Alpha is best suited for this data because it can be adjusted for a variable number of annotators assessing different tweets, handles missing data, and is uniformly more powerful than competing methods[6]. Missing data will be an important consideration when using a decision tree approach, where annotators have the option of choosing "Not Applicable" when coding text labels.

In this paper, we propose a method to develop a high-quality, gold-standard training corpus tailored for firestorms. The proposed method utilizes crowdsourcing and guided decision trees to aid people in systematically labeling tweets. We contrast this approach with off-the-shelf classifiers and crowdsourcing without decision trees. We demonstrate that crowdsourcing with

guided decision trees improves the quality and feature space of the training corpus for developing automated classifiers.

2. LITERATURE REVIEW

This work contributes to the study of online firestorms. Firestorms are defined as "an event where a person, group, or institution suddenly receives a large amount of negative attention [online]"[7]. A firestorm can be characterized by an instance where sudden negative attention is in response to a recent action and arises without prior discussion. For the purpose of this research, the focus was placed on online protest and social debate—these events are often fast moving and often have part in influencing the public's perception of an issue.

The hashtag grew in popularity and ultimately made it on Twitter's list of trending topics for a nontrivial period, but it did not come without response from supporters of Colbert in defense of his comedic style. Because of this polarity, this firestorm shows the importance of detecting sentiment around a given hashtag, as individuals can tweet (using the hashtag) having strayed from the sentiment that the original author had hoped for. The data used in this paper are selected from a corpus of 80 firestorms presented by Lambda et al. [7].

Their data were obtained using Twitter's decahose, which represents an approximately 12% random sample of the Twitter content associated with the #CancelColbert firestorm. The additional 2% above the 10% of tweets is obtained by extracting retweet and mention messages from the 10% random sample of the corpus. Their #CancelColbert firestorm sample consisted of 10.1 MB of data and included 15,591 unique tweets. A sample of 200 tweets from this corpus was selected at random for use in an Amazon Mechanical Turk (AMT) experiment and in comparison with off-the-shelf classifier performance. While limitations of Twitter's sampling methodology are noted [8], these data represent a sufficient corpus for the purpose of evaluating construction of a gold-standard training set. Several off-the-shelf classifiers exist for assessing sentiment within Twitter data. AFINN, from Finn Årup Nielsen, is an English wordlist-based approach for sentiment analysis.

The AFINN lexicon assigns words with a score that runs between −5 and 5, with negative scores indicating negative sentiment and positive scores indicating positive sentiment [9]. The NRC Emotion Lexicon, from Saif Mohammad and Peter Turney, is a list of English words and their associations with eight basic emotions (anger, fear, anticipation, trust, surprise, sadness, joy, and disgust) and two sentiments (negative and positive). This lexicon categorizes words in a binary fashion ("yes", "no") if it fits into one of the emotion categories.

The Bing classifier, by F. Ceci et al., categorizes words in a binary fashion ("positive", "negative") [10]. When applied to a data corpus, however, each of the off-the-shelf sentiment classifiers differs somewhat in their assessment of sentiment. There are many potential reasons for this such as how classifiers treat the presence of sarcasm, humor, and colloquial symbols or text. Differences in classifier performance, however, bring into question the veracity of a given classifier for firestorm sentiment analysis. Developing a tailored classifier for firestorms requires the construction of a gold-standard training corpus.

3. DISCUSSION

The purpose of this project is to analyze the sentiment of politically, socially, and/or culturally charged tweets. Please try and identify them in this context. Keep in mind that you are to rate the Twitter user's sentiment or position, and that you are NOT rating the tweet based on your personal feelings on the subject. Please answer the following questions for a given tweet. Structuring the AMT crowdsourcing task in this manner allows additional features to be captured for the training corpus and is likely to screen out ambiguous sentiment in the cognition of the annotator. We posit that this will improve IAA. Ethics approval for this study was approved by

the Johns Hopkins University Institutional Review Board (IRB) for use of AMT workers in the crowdsourcing tasks. All AMT workers were presented with the background and purpose of the study and could opt-out at any time. AMT workers acknowledged informed consent prior to participation in the project.

It can be seen that all questions meet the Bayerl scale for good agreement and questions 1A, 2B, and 4 exceed the benchmark for excellent agreement. These questions require AMT workers to accurately assess tweet position, lack of sentiment, and humor, given that they accurately recognized whether a tweet expressed a position, sentiment, or humor. The guided decision tree allows the data scientist to effectively control for recognition when assessing IAA on coding/label assignment to twitter data. It is surprising that the IAA rate for the AMT experiment performs worse than the off-the-shelf sentiment classifiers. Consistency among off the-shelf classifiers with each other, however, does not mean that those classifiers are more accurate at classifying sentiment within this specific Twitter firestorm. It could represent a systematic bias. In any case, the best-case scenario still falls below established quality standards for use.

4. CONCLUSION

Constructing a Twitter training corpus using crowdsourcing with a guided decision tree appears to improve the quality of the corpus over off-the-shelf or simple crowdsourcing approaches. The decision tree effectively broke down a complex task into smaller problems that allowed AMT workers to achieve higher rates of agreement. It also provided a means for raters to remove bias when evaluating different types of tweets by first cognitively assessing the position and tone of the tweet prior to rendering a judgment. The ability to detect a positive, negative, or neutral sentiment remains a nuanced process, however, especially when language constructs such as humor and sarcasm are in play. Since these language paradigms are often difficult for a machine or artificial intelligence to detect, it is notable that AMT workers had a higher percentage of agreement when rating tweets for these factors in the guided decision tree approach. Arguably, linguistic factors such as humor and sarcasm are just as important (if not more important) as detecting sentiment, especially in a firestorm context surrounding a social debate. It is also notable that when AMT workers were not guided through a decision tree, the presence of humor and sarcasm degraded their IAA rating.

The AMT experiment was focused on a single firestorm corpus and utilized a random sample of 200 tweets. Future research may investigate additional firestorm corpora and may include random samples with more tweets. The required sample size estimation could be performed by investigating the sensitivity of IAA rating by randomly removing sampled tweets. Similarly, the same decision tree structure could be applied to different corpora to evaluate the sensitivity of the data corpus on the findings. Despite these limitations, this paper further demonstrates the inherent limitations of off-the-shelf classifiers. It highlights unique challenges for sentiment classification present within online protests. As Internet activism flourishes due to the immediacy of social media, the hasty spread of information, and political engagement; construction of high-quality training corpora becomes more important. These data challenges call for more work in classifying additional data features such as emotion, sarcasm, humor, polarizing positions, and even “hijacked hashtags”. The crowdsourced, decision tree approach presented in this paper has proven effective in developing a high quality gold-standard training dataset that outperforms off-the-shelf solutions.

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SURVEY ON SECURITY ISSUES IN MOBILE CLOUD COMPUTING AND PREVENTIVE MEASURES

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ABSTRACT

Mobile cloud computing (MCC) is a recent technology used by various people in their daily lives. It is estimated that roughly 1.5 billion smartphone users and 640 million tablet users in the world use mobile cloud computing. Mobile cloud computing (MCC) is the blend of cloud computing, mobile computing and wireless networks that brings rich computational resources to mobile users, network operators, as well as cloud computing providers.Mobile Cloud Computing (MCC) is a recent technology used by various people worldwide. In 2015, more than 240 million users used mobile cloud computing which earns a profit of $5.2 billion for service providers. MCC is a combination of mobile computing and cloud computing that presents various challenges like network access, elasticity, management, availability, security, privacy etc. Here, the security issues involved in both mobile computing and cloud computing, such as data security, virtualization security, partitioning security, mobile cloud application security and mobile device security are considered extremely important. This paper presents a detailed study of security issues in mobile cloud computing and enumerates their preventive measures.

KEYWORDS: *Mobile Computing, Cloud Computing, Security, Virtualization, Privacy, Authentication, Storage.*

1. INTRODUCTION

The simplified definition of mobile cloud computing is: distributed computing is characterised as the pattern in which resources are given to a customer on an on-demand premise, for the most part by methods through the web[1]. Mobile cloud computing uses infrastructure as a service platform of the cloud for storage and processing, and cloud-based applications move the computational power and information storage into the cloud. MCC is a rich mobile computing technology that leverages unified elastic resources of varied clouds and network technologies towards unrestricted functionality, storage and mobility, and serves a multitude of mobile devices anywhere anytime through the Internet regardless of heterogeneous environments and platforms based on the pay-as-you-use principle. Mobile cloud computing is used by the user using various browsers available like Chrome, Firefox. UC Browser, etc. Mobile cloud

computing is one of the quickest developing segments of the cloud computing worldview. Apple and Google are the two playing the main role in the development of mobile cloud computing. By 2016, 60% of mobile development industries have used cloud services as pay-as-use that reduces resource deficiency and makes devices compatible to use cloud services in mobile devices.

1.1.Mobile Cloud Service Models

The concept of mobile cloud computing is categorized in different service models. Some of the prominent models of mobile cloud services are as follows.

- Mobile Cloud Infrastructure as a Service (MIaaS) This service model provides the cloud environment and storage facility for the mobile user. It is like the infrastructure as a service model of cloud which provides all the infrastructure for cloud. The example of MIaaS is Apple iCloud: it is Apple's own cloud-based storage system and initially, it gives 5 GB free storage. The other examples are Amazon Cloud, Dropbox, Google Drive, Microsoft OneDrive, etc.
- Mobile Network as a Service (MNaaS) This service model offers network infrastructure to users for creating a network. In other words, we can say that mobile network as a series is used to create a virtual network and for connecting mobiles with servers. The example of MNaaS is OpenStsck: it is used to create virtual networks. The other examples are CoreCluster, OpenVZ, SmartOS, etc.
- Mobile Data as a Service (MDaaS) This service model provides database service so that mobile cloud users can perform data management and other operations to their data. Example: CloudDB-Cloudbased database made for mobile cloud computing. Oracle's mobile cloud data as a services.
- Mobile Multimedia as a Service (MMaaS) This service model offers a platform to access or run the multimedia in the cloud environment, like playing high-memory capacity required games, playing high-definition videos, etc.
- Mobile App as a Service (MAppaaS) This service model provides a platform to users for executing the app, and the using app also manages the apps using the wireless network. Examples: Apple App Store, Google Play Store, etc. 2.6 Mobile Community as a Service (MCaaS) This service model offers the facility to mobile users to create a community network or social network and to manage all such networks and get the services needed for them.

1.2.Generalized Security Requirements

International Telecommunication Union (ITU) and US National Security Agency [8, 9] have defined and laid down certain generalized security requirements of mobile cloud computing. They are as follows.

- Confidentiality is a fundamental requirement because mobile users' data are processed through the public network and is also stored in public servers. So there is a high chance of unauthorized access to mobile users' data, owing to which the issue of confidentiality is a big challenge to mobile cloud service providers.
- Availability means cloud service is always available for users 24/7 when they need the service. There are various attacks that affect availability, but mobile cloud computing service providers need to prevent them and always ensure the service is available for mobile users.
- Authentication and Access Control means identifying the valid user of the system by some login patterns or any other mechanism called authentication. Giving access to limited resources to authenticate users of the system as they want to do some task is called access

control. Actions performed by users like reading, writing, updating, erasing data, etc. are all controlled in access control.

- Integrity means prevention of data loss or data modification while transmitting it through the public network. Integrity deals with consistency and accuracy of user data.
- Privacy is the security of mobile user's personal data while communicating in the cloud, achieved through confidentiality, integrity and authentication.

1.3. Challenges in Mobile Cloud Computing

Mobile cloud computing is a service of cloud computing used in smartphones or in tablets. Mobile computing and cloud computing combine together to form mobile cloud computing and give services of cloud to mobile computing users like on demand self-service, resource pooling measured services, elasticity, broad network access. Mobile cloud computing uses wireless communication technology to communicate between mobile and cloud. Owing to the combination of mobile computing and cloud computing and use of wireless communication, we face many challenges in mobile cloud computing, such as limited resources for mobile devices, stability challenge occurring due to limitation of wireless network, cost of network access going high various times in mobile cloud computing, elasticity challenge, security and privacy challenge, bandwidth of channel, energy efficiency, quality of service, etc. This paper is divided into four sections. The introduction section throws light on the journey of mobile cloud computing, its various definitions, statistics, service models and security requirements of mobile cloud computing and challenges it faces. The second section discusses the security issues of mobile cloud computing. The third section presents preventive measures relating to security issues, and the fourth section gives the conclusion (Figure 1).

1.4.Data Security Issues

In mobile cloud computing mobile user's data are available and stored in the cloud and the processing of that data is also done in IaaS of the cloud. Many attacks are executed on data of mobile cloud computing like data loss, data breach, data recovery from damage, data locality, data correctness, etc. In data loss, user's data are mossed while performing any computational task; for example, while transmitting data through public network. In data breaches, an authorized user's data are accessed by an unauthorized person by injecting into the cloud or by getting it using any unwanted activity. In data recovery from damage issues, a user should get valid data of his own while recovering due to damage of system or mobile device. Cloud stores the data in any data centre; so the location of that data not known to anyone. So the challenge is that the user should know where his important data are stored. Data management is done in the service providers' premises and they need to maintain confidentiality and integrity.

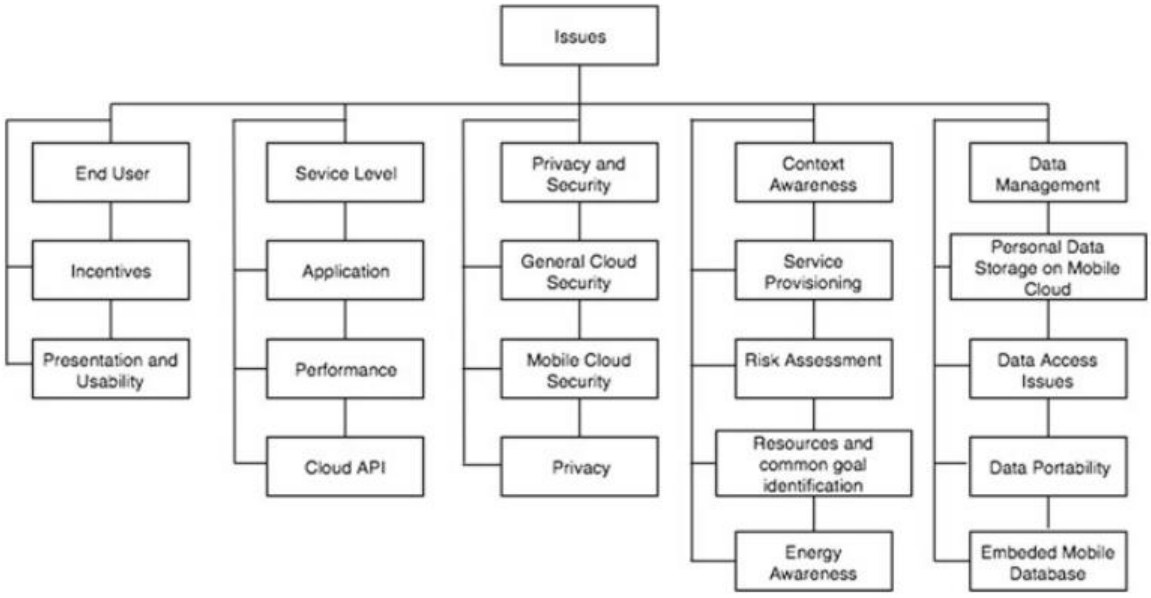

Figure 1: Issues in Mobile Cloud Computing with Respect to Other Computational Activities.

1.5.Virtualization Security Issues

Cloud services are provided to mobile users using virtualization. A virtual machine of mobile is re-installed in the cloud, which is called as mobile clone, and this cloud based virtual machine does all the processing. The main advantage of using a virtual machine is that it creates instances of various machines and this is achieved through the hypervisor. But the challenges to the virtual machine used in cloud computing are unauthorized access to the main machine through virtual machine, root attack, VM to VM attack, communication in virtualization and confidentiality of data while being processed through hypervisor.

1.6.Offloading Security Issues

Offloading means transformation of the task to an external platform. Mobile cloud computing requires wireless network for offloading in the cloud, but precisely because of this, unauthorized access of data is possible during offloading. The main issue in offloading is availability which happens because of the jamming of the mobile device while the offloading is taking place. Also, while offloading of data if it contains any malicious content, then it affects the confidentiality and privacy of the mobile user.

1.7.Mobile Cloud Applications Security Challenges

Various mobile cloud applications are affected by various malware, worms, Trojan horse, botnet, etc., which in turn affect the confidentiality and integrity aspects. These malwares are run in mobile devices and bind themselves in the application and mutate, which cause very serious issues to mobile cloud computing.

This is the most ubiquitous issue in mobile cloud computing occurring due to theft or loss of the mobile device. Here, the main loss is of the user's data. If the attacker gets access into any mobile device then unauthorized access to data and application occurs. The device can also be used to do some unwanted tasks like botnet: to carry out DoS or DDoS attack through mobile device. A new attack related to power consumption is carried out on mobile devices when the device is connected to the wireless network; then its power consumption increases to discharge device battery fast. Mostly, a mobile device stores user's personal information into internal storage; but when the user uses mobile cloud computing then all data are synchronized to cloud

and there the security of user's personal data becomes insecure. In mobile computing, malware and viruses constitute the very old methods of attacks but they are effective and work in mobile devices.

2. LITERATURE REVIEW

Liang et al. have given a technique to secure virtual machine deployment, which uses mandatory access control technique to control resources and gives powerful isolation from guest virtual machines[2]. Hao et al. invented a new SMOC technique which gives permission to make a copy of operating system and application of mobile to a virtual machine on the cloud for data security[3]. Paladi et al. developed cloud infrastructure which includes virtual machine launching and data protection protocol[4]. Virtual machine launching is used before a guest virtual machine and data protocol ensure confidentiality using the cryptographic technique.

Mollah et al. have given data sharing and searching technique for mobile devices for sharing and searching data in the cloud securely through public and private key encryption and digital signature[5]. He introduced the remote data audition method which verifies and stores data integrity in the cloud. He also developed a divide and conquer table (DCT), which updates at the block level.

Odelu et al. proposed a technique to access control and outsourcing computational process from cloud to mobile[6]. Here, two schemes are developed: Secure and lightweight CP-ABE (SL-CP-ABE) and CP-ABE-Constant size type text and secret key (CPABE-CSCTSK). Li et al. developed secure accessing in cloud platform 2SBM (Inter-crossed Secure Big Multimedia Model), which is based on ontology access recognition and matching algorithm[7]. Alqahtani and Kouadri-Mostefaou designed the framework based on distributed multi-cloud storage, encryption and data compression, in which data are divided into segments, then the encryption of segments takes place and then these encrypted segments are compressed[8].

Jin et al. developed (hardware-assisted secure virtual machine (H-SVM) technique which secures guest virtual machine from infected hypervisor by memory virtualization [9]. This technique is very useful and it is less vulnerable. Vaezpour et al. developed a SWAP technique for phone clone. This technique is based on two other techniques: first, securing mobile clone to lessen the threats for data leakage from the virtual machine and second, migration of clone when the threatened virtual machine is at high-level risk[10].

3. DISCUSSION

Application offloading technique in which users' private information is kept within the mobile while offloading is being performed. Owing to this, unauthorized access and integrity security problems do not occur. This technique preserves privacy and also saves energy. This technique consists of three steps: in the first, data are divided into sensitive and non-sensitive segments, in the second, sensitive data processing takes place on the device and in the third, non-sensitive data processing takes place in cloud. Profiling and decision-making are used for dynamic partitioning to reduce power consumption and decrease security issues. Offloading engine is used to offload app to cloud for processing. Cloud manager-based re-encryption scheme (CMReS) cryptographic method which protects offloading. This method uses encryption, decryption and re-encryption of data for more security while offloading and, additionally, it is under the control of client organization.

Application program interface (API) model consisting of three factors: first, authentication with user registration with storing passwords, second, security mechanism like encryption, decryption, digital signature and third, API with backend services. Secure mobile cloud (SMC) developed an application to confirm the security of data communication in the cloud as well as in mobile device. It measures the integrity of application when interacting with a mobile device. In

application integrity, first verification of application takes place, and then its signature is matched with the original application signature for finding any attachment in it. In this application, six different managers are used: mobile manager, mobile security manager, cloud security manager, optimization manager, application manager and policy manager.

4. CONCLUSION

In the first section of this paper, mobile cloud computing is explained in detail, which includes definition, history and security introduction about MMC. Various security issues are available for mobile cloud computing. However, the issues discussed in this paper are basic and very important. The prevention measures enumerated are very recent solutions to security issues of mobile cloud computing. A technique for authentication of the user by using biometric features. In this technique, biometric includes the hand movement of a user grasping the mobile which generates patterns and those patterns are used for identification of authorized and unauthorized users. In authors discussed Google device policy application. This application is very much useful when the mobile device is stolen or lost user can clean his data online and also enables device token (unique key) which ensures the notification security. the approach of OpenFlow in which OpenFlow switch is integrated with mobile to do the job of redirection, while communication of mobile and all cloud data is passed through OpenFlow, so that the data are secure while being transmitted.

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WAYS TO DEVELOP PROFESSIONAL COMPETENSE OF FUTURE MUSIC CULTURE TEACHERS

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ABSTRACT

The article provides information on the issues of teacher self-improvement, further development of personal competence and professional competence.Competence requires constant enrichment of professional knowledge, learning new information, understanding of important social requirements, and the ability to search for new information, process it and apply it in their work.

KEYWORDS: *Competence, Professional Competence, Non-Standard Situations, Self-Esteem, IndividualDevelopment. Composer, Music, Book, Note, Creativity Ability, Talent, Music Education, Person, Attain Perfection, Music Art, Sing, Listen, Hear, Rhythmic Movement.*

Great history does not disappear without a trace.

It is kept and reproduced in genetic code

Of people, in their historic memory and deeds.

Its mightily power lies in this.

Retention and studying the historical heritage,

Transfering it from generation to generation

Is one of the most important?

Priorities of our government

Sh.Mirziyoyev

Prezident of the Republic of Uzbekistan

INTRODUCTION

We know that today's wool music teachers must work hard be creative and respect children.The concept of "competence" is a psychological study in the field of educationas a result. Competence is based on "the ability of a specialist to behave in unusual situations, in unexpected situations, to communicate, to communicate with competitors, to perform uncertain tasks, to use

information from conflicts, to develop more and more consistently".Special knowledge by a professional competence specialist.

Competence requires constant enrichment of professional knowledge, learning new information, understanding of important social requirements, and the ability to search for new information, process it and apply it in their work.

Educator as a specialist: - Improving the pedagogical process on the basis of a clear goal, aspiration; - increase the efficiency of the pedagogical process, its activity; - Assimilation of pedagogical knowledge, which is constantly updated; - be aware of advanced technology, methods and tools; - effective implementation of the latest scientific and technical innovations in its activities; - professional skills and competenciesimprovement; - His practical actions in the search for measures to prevent and eliminate negative pedagogical conflicts represent his work on himself.It is useful for educators to be project-oriented in their consistent, effective work. It is desirable that they be able to form the following model on the basis of a project approach. The model records the stages of self-study and the tasks to be performed at each stage. The effective solution of the tasks set for each stage allows to move to the next stage. Once the tasks of a certain stage are solved, the educator notes this situation in a separate paragraph.The ability of the educator to self-analyze is also important in gaining professional competence. Self-analysis is the study of the essence of one's own practical actions organized by the educator in professional activity. Through self-analysis, the educator is able to make an objective self-assessment. After all, it is important for educators to have the qualities of professional competence, as well as their self-assessment skills.Self-Assessment (OEA) - through self-analysisself-esteem. Self-assessment of the subject's personal capabilitiescalculation, self-assessment, self-satisfactionprovides.

THE MAIN PART

Self-assessment is the manifestation of one's abilities in one's own strengthyou need help. Self-assessment, but directly to the individualcan be prepared.A number of factors affect the ability to evaluate effectively. SelfEffective evaluation factors:

1. Self-understanding (having clear information about oneself).

2. Awareness of self-worth as a person (positive about oneselfdata collection).

3. Self-control (of personal opinion about oneselfconforming to the value given to him by those around him.

The level of self-esteem is one’s self-satisfactionunsatisfactory. In this case, the indicators of self-esteem are the individualcapacity. Self-increasing or decreasingdisplay leads to inaccurate self-assessment indicators.In a number of studies, the specialist, including the educator himself. The "Individual Development Program" is said to be useful in the development ofthe Individual Development Program (IRD) is for each individuala certain quality in the specialist himself, BKM, professional competencedeveloped based on the needs of formation and developmentprogram of personal-practical character.Like any specialist, the educator is personal-practical for himselfto develop an "Individual Development Program" of a character. It is necessary to organize pedagogical activity on the basis of educator's individual development program - as a specialist. The teacher individually has this or that professional-pedagogical quality, formation of knowledge, skills, abilities, qualities of professional competenceand personal-practical developed based on development needscharacterprogram“Individual development.

The program consists of the following elements:

1) Pedagogical knowledge

2) Psychological knowledge;

3) Specialty knowledge;

4) Didactic skills;

5) Skills of organization of educational work;

6) Professionally important features of the psyche and personal qualities;

7) Goals of self-development;

8) Assignments for self-development.

In the science of music, Farobi was not only a theorist but also a practitioner. He is also a well-known musician, a great musician and composer, and an inventor of new musical instruments. Reflecting on the amazing magical power and miraculous effects of music, Farobi writes in On the Origin of the Sciences: In particular, in the national culture, music reveals a world of high emotions, pleasure - exciting ideas. It brings people to a level of spiritual richness, pure perfection. The child can still feel the music without knowing how to hold a pen and read and write. Often these first impressions influence the formation of attitudes towards music. Therefore, music education has also been included in the main directions of the reform of general education schools. Music, first and foremost, softens children's emotions. Like the sense of musical works, it evokes many human qualities in them. Of course, literature, history, sports and other fields play an important role in the development of human qualities. Therefore, poetry and music always live side by side. The sense of music is born under the influence of nature, and is formed in kindergarten and school. Music lessons educate students not only in terms of sophistication, but also in a broad sense, spiritually and morally. It would be good if our songs, which have been passed down from generation to generation, and which have withstood the ravages of time and embodied the dreams, aspirations, thoughts and aspirations of the people, should be included in the curricula of all types of educational institutions.The world-famous writer ChingizAitmatov writes in his novel "Kunda": "... life, death, love, passion and inspiration are all sung by music, because we achieve the highest freedom through music, for this freedom from the time when our minds were enlightened.We've struggled all our history, but we've only achieved it through music. " The masterpieces of music created by our people are to a certain extent reflected in every activity, every second - in education, work, and social relations. National music teaches to perceive and appreciate the beauty of the surrounding events, armed with delicate taste and free thought, and expands the spiritual world.

In the activity of singing, a musical worldview, musical taste is formed. In this type of activity, children sing based on their musical knowledge. To do this, they assimilate information relevant to the piece of music. In the process, they develop a musical outlook and musical taste. In music literacy activities, musical thinking, imagination and musical worldview are formed. In this type of activity, children learn about the history of music, the means of expression of music - rhythm, meter, register, measurement, mode, tempo, note path and writing, length and pitch of sounds, music creators, performers, as well as their musical thinking. This in turn takes children into the world of music and shapes their musical worldviews.

Musical worldview, musical taste, musical thinking, musical perception, musical sense of rhythm and musical memory are formed in children in the process of accompaniment on musical instruments. In this type of activity, almost all musical psychological features are formed in children. In this activity the child thinks independently (musical thinking), as a result of which his musical worldview is formed. At the same time, it should be noted that music, regardless of the type of activity, helps to form all the psychological aspects of the person. It should be noted that each of the musical activities has its own influence, albeit partial, on the formation of all the

listed psychological features. In particular, it shapes musical emotions, musical worldview, musical perception, musical thinking, musical imagination, and musical ability. So, they also have an impact on the formation of children's general musical culture, aesthetic worldview. This is one of the most important aspects in the development and upbringing of a harmoniously developed person. The pedagogical nature of music has a great impact not only on the individual or the individual, but on society as a whole. Because music has a special significance as it has a spiritual effect on people's hearts. Therefore, academician Said Shermuhammedov connects this process with artistic and aesthetic activity. That is, "The experience of the development of literature and art, the whole artistic culture, - says the scientist, - shows that the ideal of the creator is embodied in the content of the work on a universal scale, brightly individualized - in vivid unique images, humane spiritual, artistic-aesthetic, moral-spiritual If it is high in terms of quality, it will be such a huge contribution to the treasury of world culture."So, considering the impact of music on the human heart, we see that the above ideas are directly related to the art of music itself. The educational nature of music is manifested in a number of aspects in the relationship between science - man - society - natures. Therefore, the attention paid by our state to music, literature and art shows that its influence is enormous.

First, music shapes and strengthens a healthy lifestyle. Nowadays, the penetration of music therapy into medical science is a new direction in science, which is giving its effective results in the treatment of human diseases with music, through music. Second, it eliminates some of the flaws in people's behavior and the mentality of nations. That is why music is called "philosophy without language". After all, the acquisition of musical knowledge is closely linked with the spiritual world of the individual In conclusion, it should be noted that future educators are stillprofessional, individual competence is underdeveloped. Self-assessmentand in assessing the level of pedagogical competence for themserves as the main criterion. Every educator is constantly on their ownshould go its own way. This is their future mature staffprovides.In any case, it takes a lot of work to be proud of the profession of music teachers, because music gives people kindness and peace.

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NEIGHBORHOOD SOCIAL PROTECTION MASK

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ABSTRACT

The role and importance of the mahalla in the socio-political, economic, spiritual and ideological life of Uzbekistan is enormous. The mahalla is a social institution that reflects the character, lifestyle and content of the Uzbek people, and usually unites, organizes, directs and encourages the nation to act on a community basis.

KEYWORDS: *Socio-Political, Economic, Spiritual And Ideological, Public And Social Administration, People With Disabilities, People Who Have Lost Their Breadwinners, Families With Many Children, Single Mothers, Citizens Affected By Natural Disasters, Low-Income Families.*

INTRODUCTION

The role and importance of the mahalla in the socio-political, economic, spiritual and ideological life of Uzbekistan is enormous. The mahalla is a social institution that reflects the character, lifestyle and content of the Uzbek people, and usually unites, organizes, directs and encourages the nation to act on a community basis.

During the Soviet dictatorship, the ruling system and political ideology did not officially recognize the mahalla as a national social institution, but instead treated it as a remnant of antiquity, a remnant of "medievalism." Under Soviet ideological pressure, the Uzbek Supreme Legislature banned all financial and economic activities in the mahalla in 1961. However, such conflicts did not negatively affect the place, role and importance of the mahalla in Uzbekistan. The neighborhood continued to function as an independent self-governing entity, and people made no secret of the fact that they needed his help in solving their problems.

Emphasizing the importance of the issue, the first President of the Republic of Uzbekistan I.Karimov said: we see that the essence is growing day by day. Therefore, the role of the mahalla in our life is high, its legal framework is developing in all respects, the more we strengthen this institution as an integral part of the political, economic and spiritual life of our society, the lower management system, create all the material and financial conditions. , I think this will be a big step towards achieving the lofty goals we have set for ourselves ”[1-P.109].

Taking into account the fact that the mahalla is an influential socio-political, economic, spiritual and ideological institution, Article 105 of the Constitution of the Republic of Uzbekistan states that “ (elder) and elects his advisers [2-P.29].

In September 1993, the Law "On Citizens' Self-Government Bodies" was adopted. According to him, the mahallas had their own legal status and became part of the local government. This means that mahallas, as an important pillar of the state on the ground, as a legal entity, have their own property, financial budget, bank account-fund. Thus, in the context of achieving state independence and political sovereignty, there is a growing desire to restore the national form of statehood, to make fuller use of national traditions and customs in the social life of the peoples of Uzbekistan.

The Law “On Citizens' Self-Government Bodies” [3-P.189] defines the mahalla, the duties and responsibilities of its chairman. In particular, Article 22 provides for public control over the protection of the interests of citizens in public authorities and administration bodies, courts, enterprises, institutions, care for the welfare of the neighborhood, assistance in improving trade and communal services, providing a culture of service to citizens. to assist in monitoring the sanitary condition of settlements, water supply sources, housing, schools and other institutions; it has been established that it has a number of powers, such as making proposals for the improvement of living conditions ”[4-P.12].

Given the growing prestige of the mahalla since the early days of independence, the Uzbek government has begun to pay special attention to it. On September 12, 1992, the Decrees of the First President of the Republic of Uzbekistan I.Karimov "On the establishment of the Republican Charitable Fund" Mahalla “and on October 8, 1992" On the allocation of funds to the Republican Charitable Fund "Mahalla” were issued.

On October 17 this year, the resolution of the Cabinet of Ministers “On the organization of the Republican Charitable Fund”“Mahalla” was published. The resolution identifies the following main areas of the Fund's activities:

- Wide promotion of historically formed national and spiritual values, popularization of the best customs and traditions of our people, the organization of cultural and educational work among the population of the republic;

- Carrying out active propaganda and advocacy work on humanity and compassion, mutual understanding between people and the explanation of the ideas of good neighborliness;

- Comprehensive social protection of the rights of low-income families, the disabled, the elderly and children living in each specific area;

- Holding various traditional ceremonies;

- Free financial assistance to needy families and individuals;

- Beautification of mahallas;

- Coordination of work to improve the activities of local mahalla committees of the republic [5-P. 36].

In Kashkadarya and Surkhandarya regions, serious and exemplary work has been done to increase the place and role of mahallas, their role in social protection. It should be noted that the difficult economic situation in Uzbekistan in the early 1990s, the breakdown of existing economic mechanisms, unemployment, certain difficulties in the part of the population in need of social protection required the Uzbek government to take serious action in this regard.

In particular, in accordance with the Decree of the first President of the Republic of Uzbekistan I.Karimov "On measures of social protection in connection with the liberalization of prices" on December 29, 1997, the minimum wage was increased 5 times and increased from 70 to 350 soums [6-P. 75].

Supporting the lonely elderly was especially important during this period. There are 30,573 of them in the country, of which 1,717 were from Kashkadarya and 1,861 from Surkhandarya region [7-P. 120].

In the activities of neighborhood funds, priority was given to the issues of social protection of lonely elderly people, lonely citizens in general, large families with minor children. On August 23, 1994, the Decree of the First President of the Republic of Uzbekistan "On measures to strengthen the social protection of low-income families" began the participation of citizens in the performance of state functions of local self-government [8-P. 120].

According to the decree, special funds were established to provide financial assistance to citizens of castles, villages, auls and mahallas - low-income families in self-government bodies, the main sources of which are the republican and local budgets, extra-budgetary sources - public and charitable funds, enterprises, farms and citizens. organized voluntary donations. Also, from October 10, 1994, low-income families were instructed to make monthly payments from the funds of these funds.

Low-income families were determined based on the recommendation and opinion of the neighborhood committee. That is, low-income families include low-income families and single citizens who, for objective reasons, are unable to meet the basic needs of the family (large families with minor children, families with chronic disabilities, families of the unemployed, single pensioners and others in dire need). families) and provided monthly financial assistance.

Financial assistance to low-income families is determined by the decision of the citizens 'assembly of the village, village, aul, urban mahallas, and if it is not possible to convene a meeting, the meeting of citizens' representatives of castles, villages, auls, streets, settlements , 1.5 to three times the current minimum wage, the allocation and unused budget funds to self-government bodies to be spent on the improvement, gasification and water supply of housing, as well as other social problems, according to the decision of the citizens' assembly the need for [9-P. 150].

The issue of providing financial assistance to low-income families was one of the most difficult, complex issues, because it was necessary to solve the problem only from the point of view of justice, objectively. It should be noted that this was a manifestation of democracy, its practical solution.

Given the fact that the Uzbek people are a nation with many children and its role in creating certain difficulties in the social protection of the population, the government has paid great attention to the issue of financial support for families with children. In this regard, it is worth noting the Decree of the first President of the Republic of Uzbekistan I. Karimov dated December 10, 1996 "On further strengthening the state support of families with children." According to him, from January 1, 1997, benefits for families with children are appointed by citizens' self-government bodies - towns, villages, auls, mahallas, and the need for such pensions is taken into account. According to the above, families with 1 child will be paid 100% of the

minimum wage, families with 3 children - 140%, families with 4 or more children - 175% [10-P. 150]. The decree emphasizes the need to adhere to the principles of social justice, ensure wide openness and transparency, and achieve targeted and effective use of allocated funds when making decisions on benefits for families with children. By the second half of the 90s of the last century in Uzbekistan there was a formation of the mahalla as a socio-political, economic, spiritual and ideological institution and an independent entity. They provide a just solution to human problems, protect the economic, social, spiritual and legal interests of families, provide social protection to low-income families, the elderly, war and labor invalids, orphans, victims of natural disasters, beautification and comprehensive assistance to them. as an organ has gained an influential reputation in society.

In this regard, a lot of positive work has been done in Kashkadarya region. In 1998, there were 1 city in the region, 14 districts had branches of "Mahalla" funds, which included 368 mahallas with legal status. Of these, 180 were reorganized in urban and district centers, and 188 were reorganized under rural citizens' assemblies. 226 mahallas operated on a community basis in the villages. 368 mahalla elders and as many secretaries were paid from the local budget in the khokimiyats.

The regional branch of the Mahalla Foundation has done a lot of good work. In 1997 alone, food products worth 35,000 soums were distributed to 50 families on the occasion of Navruz. On the eve of the Independence Day of the Republic, clothes worth 36,000 soums were donated.

The activists of the mahalla regularly supported the activities of entrepreneurs and businessmen in the region in the field of social protection. Gulchehra Pirimkulova, chairman of the Karlugbogot mahalla in Karshi, Tora Mansurov, head of the Mansur ota private teahouse, Samad Nasrullaev, head of the Ali Salim teahouse, and Ahmad, head of the Rohat Ahmad teahouse in Kasan district. Dozens of entrepreneurs, such as Hoji Nasriddinov, spent part of their income on neighborhood improvement, social protection of low-income families [11-P. 2].

It should be noted that the task of the mahalla was not only to solve the material and economic problems of the population. The neighborhood has become the center of socio-political, spiritual and ideological life of the people. Attention was paid to such issues as increasing the social activity of the population, raising the legal culture, political level.

As a result of the work carried out, the trust of the population in the neighborhood committees has increased. The reason for this is that the mahallas have begun to move to the practice of purposeful work among the population in the organization of their social protection.

For this purpose, the needy population of Surkhandarya region was analyzed and a system of material and economic assistance and charity was developed. In particular, in 2005, financial assistance and benefits were provided to 5 categories of the population. These were:

- large families;

lonely senior citizens;

families and orphans who have lost their breadwinners;

families with disabilities;

other categories of needy families.

In providing material and economic assistance and charity to this category, neighborhood committees were not limited to the use of budget funds. In general, such assistance was provided by the Mahalla Foundation, the mahalla citizens' assembly and other sponsors. For example, in the third quarter of 2005 alone, sponsors provided $ 55.2 million to large families in Termez.

soums, 23.2 mln. soums for Sherabad district. soums, for Qizirik district - 41.4 mln. soums, 42.5 mln. soums for Angor district. UZS were allocated [12-P. 27].

Such a sponsorship movement gradually gained momentum during the study period. Due to the gradual strengthening of economic stability in the country, the improvement of market relations, the development of business and entrepreneurship, the opportunities to support the most vulnerable segments of the population have also expanded.

At the same time, the efficiency of neighborhood committees has increased. For example, in 2005 there were a total of 651 mahalla committees in Surkhandarya region. They had 642 consultants. In general, since 2003, the establishment of consultative positions on religious enlightenment and spiritual and moral education under the mahalla committees has become a great event. Such counselors could easily penetrate into the population, especially in the process of working with women, they would get acquainted with their problems, and ultimately give clear advice.

As a result, the work in this direction began to bear fruit. According to 2005 data, 1824 different events on various topics were held in Surkhandarya region. Neighborhood committees have also begun to pay special attention to the employment of the population, especially women. In 2005 alone, 1,323 women were employed in Surkhandarya region.

In Kashkadarya region, the movement of kindness to the population has expanded. According to 2006 data, the total number of low-income families in the region was 21,075. 16,500 of them received financial assistance. The volume of provided financial assistance amounted to 20256.1 mln. soums. Mercy Aid of Entrepreneurs has expanded. For example, in Kasbi district 10 families were given one head of cattle, in Mirishkor district 4 families were given 4 head of cattle, in Karshi families in need were given 10 carpets, 6 TV sets [13-P. 21].

During this period, the Surkhandarya regional branch of the "Mahalla" Fund received a total of 721 applications and complaints from various organizations and citizens. In particular, 193 applications were registered in 2002, 93 in 2003, 97 in 2004, 104 in 2005, 111 in 2006, and 123 in 6 months of 2007. These statistics show that the number of applications and complaints has been increasing year by year. The reason for this can be understood in two ways. On the one hand, in some places there are violations of established procedures. Second, citizens have increased confidence in neighborhood committees, which have viewed this body as an institution that can express their concerns and receive support.

At the same time, new initiatives have emerged in the activities of a number of mahallas. In 2006, the Surkhandarya regional branch of the Mahalla Foundation held a regional competition to promote the activities of advanced mahallas. According to him, N.Azamov from Boysun district, Navruz from Angor district, Rabatak from Qizirik district, Yangi Hayot, Uchkun from Termez, Alpomish, Mehnat-rohat from Jarqurghon district, Ismoiltepa, Kumkurgan district. It was recommended to popularize the activities and experience of “Dustlik”, “Polvontosh” in Shurchi district, “Navruz” in Denov district, “Yangiabad-1”, M.Ulugbek in Sariosiya district, “Yangi guzar” in Uzun district, “Navbahor” in Bandikhan district.

In 2002-2007, the regional, city and district branches of the Mahalla Fund received 1,560 million soums. Of this, 822 mln. soums from charitable hashars, 598 mln. UZS are funds received from sponsorship charitable donations.

Neighborhood committees used various methods and tools to provide material support to low-income families. In 2007, the Fund and sponsors provided 43.4 million soums to 2,560 children from low-income families and boarding schools in Surkhandarya region. soums worth of clothes were given. In particular, the Mahalla Fund provided 6 million soums to 511 children from low-

income families at the expense of regional branches and divisions. Assistance in the amount of 300 thousand soums was provided.

In connection with the holiday "Navruz" at the expense of funds received from the charity hashar and sponsors 2151 low-income and large families received 24.4 million soums for children and the disabled. UZS were provided. In Termez, at the initiative of the city administration and the foundation, sponsors organized special charitable events under the program of the Year of Social Protection, which provided assistance to 27 needy families. In particular, 4 TV sets and 40 carpets were given as gifts [14-P. 28].

The role of mahallas in the social protection of citizens, the improvement of the material and economic situation of low-income families, the needy population has been growing. Due to the growing activity of local self-government bodies in the Republic of Uzbekistan, efforts to build civil society, the rights of neighborhood committees have expanded. Now it has become difficult to hold any serious event without the recommendation of this social institution.

In 2008, 27,271 small businesses and private entrepreneurs operated in Surkhandarya region at the initiative of mahalla committees. In the first 9 months of 2008, 29.8 billion soums were allocated for their financial support and business start-up. soums were allocated. In addition, 14,449 young families received 4.7 billion soums from commercial banks. Mortgage, consumer and microcredits were allocated in the amount of UZS [15].

On the recommendation of the neighborhood committees, 68,000 people in Karshi alone were involved in small business.

The role of the neighborhood in supporting young families has also increased. In 2007, the regional branch of Asaka Bank in Kashkadarya region issued mortgage loans worth 1,068,000 soums to 31 young families. During the first 5 months of 2008, 34 young families received loans worth 852,500,000 soums.

In 2012, 59% of the total state budget expenditures were directed to the social sphere, ie to meet the needs of the population, real incomes increased by an average of 17.5%, salaries, pensions and stipends increased by an average of 26.5%. need to do.

In 2013, the increase in real incomes, including salaries, pensions, social benefits and stipends, increased by more than 23%.

In accordance with the state program "Year of the Healthy Child" in 2014, weddings of more than 700 children from low-income families were held.

In 2015, 2 trillion 246.5 billion soums and 229.6 million dollars were allocated for the implementation of the State Program. The “Strategy of actions on five priority directions of development of the Republic of Uzbekistan” [18], adopted on February 7, 2017 under the direct initiative and leadership of President Shavkat Mirziyoyev [19], also ushered in a new era of development in the life of our people. The announcement of 2017 in our country as the "Year of dialogue with the people and the interests of man" also has great significance. “The main goal of these reforms is to ensure a decent standard of living and quality of life for the population. The main priority is to consistently implement the noble idea that "human interests take precedence over everything else."

Today, the main goal of our life, which is reflected in our Constitution, is to ensure the full protection of human interests. In order to ensure the interests of the people, first of all, it is necessary to communicate with people, with the people, to know their worries, dreams, problems and needs. "People should serve our people, not government agencies, and this fact should be well understood by leaders at all levels."

The scope of positive work carried out in the framework of the state program "Year of dialogue with the people and the interests of man" in 2017 was also very wide. In his speech on the occasion of the 25th anniversary of the adoption of the Constitution of the Republic of Uzbekistan, President of the Republic of Uzbekistan Shavkat Mirziyoyev spoke about this work. ”[20]. In addition, in 2017, 24,000 modern high-rise buildings were built in rural areas and 187 in urban areas on the basis of new standard projects, which is an example of the attention paid to ensuring the well-being of our people.

In addition, 1,207 women with disabilities in need of housing were provided with affordable housing ”[21].

In accordance with the Decree of the President of the Republic of Uzbekistan Shavkat Mirziyoyev "On radical improvement of activities in the field of support of women and strengthening the institution of the family" from April 1, 2018 instead of advisers on religious enlightenment and spiritual and moral education In 2000 and more civic gatherings, the position of specialist in working with women and strengthening spiritual and moral values in families was introduced ”[22].

At the same time, the fact that the service houses of the mahalla supervisors are located in the mahalla and they are given a car at a discount is an example of the great attention paid to the mahalla.

In 2019, it can be observed that the following tasks have been implemented for the further development of the social sphere.

- The procedure for full payment of pensions to working pensioners has been introduced. The amount of benefits for people in need and in need of social assistance has been doubled.

-More than 116 billion soums were paid to 5,000 low-income families in need of improved housing, including women with disabilities, to purchase affordable housing on the basis of mortgage loans.

In 2020, 5.5 thousand women will be provided with soft loans worth 100 billion soums for small business projects. In addition, 1,576 women received an initial payment from the budget to acquire new housing.

Training of our sisters in need of social protection in Women's Entrepreneurship Centers was organized in short training courses within the framework of 5 important initiatives.

Thus, the role and place of the mahalla in the social protection of the population has increased.

In addition, mahalla committees have become an influential force in ensuring social stability, ideological unity in the region, regulating the living conditions of the population. Most importantly, the population's confidence in the mahalla committee and its activists has grown. The population began to look for the satisfaction of their interests in the neighborhood. Adherence to the principles of social justice in the neighborhoods has intensified.

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CLUSTERING AND ROUTING ALGORITHM FOR WIRELESS SENSOR NETWORKS

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ABSTRACT

Wireless sensor networks (WSNs) play a key role in data transmission based on the locations of sensor nodes (SNs). WSN contains base station (BS) with several SNs, and these SNs are randomly spread across the entire region of monitoring. The BS aggregates the data received from several SNs for meaningful analysis-deployed environment. Energy conservation is the major challenge in the WSN. Since SNs are battery-operated over a period of time, SNs drain their energy in sensing the region of interest and passing on the same to the BS. The consumption of energy depends on the distance between SNs and BS. The SNs are clustered with some certain criteria, and by choosing the cluster head (CH) to aggregate the gathered information by SNs along with determining the optimized path from CH to BS by efficient routing protocol are the innovative techniques in enhancing the lifetime of WSN by optimizing the energy consumption. In this work, an efficient clustering and routing algorithm for WSN using glowworm swarm optimization (GSO) and kinetic gas molecule optimization (KGMO) techniques are reviewed. The GSO-KGMOWSN technique is applied to enhance the lifetime of WSN by effectively reducing the unnecessary data transmission between SNs and BS. This in turn reduces the dead SNs over the period of time which results in enhancing the lifetime of WSN.

KEYWORDS: *Clustering, Glowworm Swarm Optimization (Gso), Optimization, Routing, Wireless Sensor Networks.*

1. INTRODUCTION

WSNs are one of the popular areas in the networks due to the constant innovations in the field of wireless technology and embedded system. Their application includes monitoring, tracking, event detection, surveillance, disaster management, and preventive maintenance. WSN comprises spatially dispersed autonomous devices called SNs having sensor to monitor environmental or physical conditions with the capability of transmitting the same through wireless technology. A WSN system includes a BS that delivers gathered data to the outside world either by wireless or by wired technology. The work of SNs to send the sensed data to gateway is called as BS.

In this process, SNs' battery will be drained due to the transmission of data. Researchers proposed many techniques to conserve energy in WSN[1]. One such technique is clustering; here all SNs are divided into many groups based on certain criteria and elect the CH among these grouped SNs. The SNs in that group send data to CH, and the CH will consolidate these data and transmit to the BS. Since the CHs transmit the data to the BS, significant energy is conserved in routing data to BS. This reduces a lot of energy consumption of individual SN. Traditional schemes for energy-efficient clustering and routing are concerned with only improving the network lifetime. But lots of problems were aroused due to the premature death of CHs and holes.

The proposed method uses a class of meta-heuristic algorithms called bio-inspired algorithm which is more suitable to the large-scale application like energy conservation in WSN, where traditional method predominantly fails due to the several conflicting criteria in optimization. The KGMO converges faster and especially suitable for such complex optimization problems[2]. The swarm-based algorithms play a vital role in solving complex real-world problems, so GSO and KGMO are used for optimized cluster formation and efficient data routing.

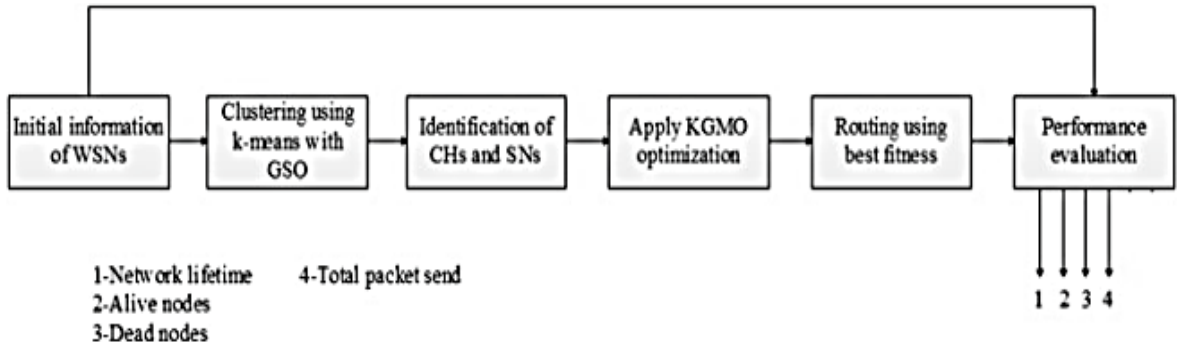

Figure 1: Block Diagram of GSO-KGMO-WSN Method

The GSO-KGMO-WSN method is to provide the energy-efficient clustering and optimized path to transmit the data packet from SNs to the BS over the network. In this method, after deploying SNs, initial clusters are formed using K-means algorithm, clusters are optimized, and CHs are elected through GSO algorithm. The data aggregated by the clustering is transmitted to the BS trough the CH by multi-hop routing involving various CHs. The routing path is optimized through KGMO algorithm. The energy-efficient process of clustering and routing is illustrated schematically in Figure 1.

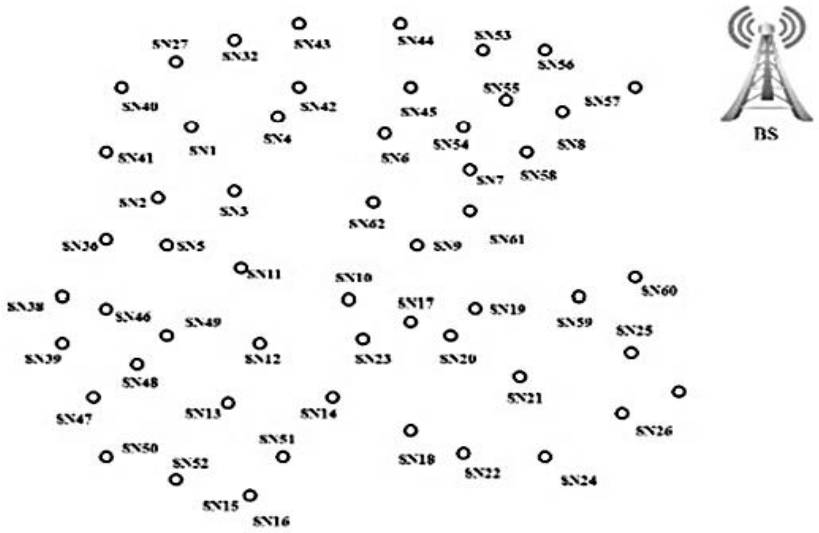

Figure 2: Random Sensor Deployment in A Network Based on the Requirement of the Application.

1.1. Creation of WSN:

Sensor network is a collection of large number of heterogeneous SNs which are having different processing capabilities, energy level, sensors, and transmission range. These SNs are randomly deployed in a network based on the requirement of the application. The inter-SN distance plays a vital role in determining the lifetime of the network. The position, energy level, type, and identifications (IDs) are communicated to the BS to provide the deployment information of the SNs. The creation of WSN is shown in Fig. 2.

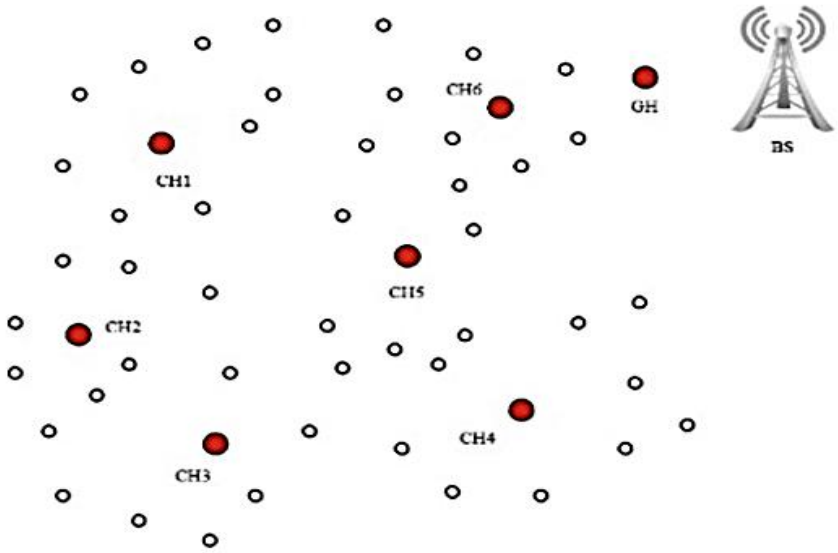

Figure 3: Cluster- Set Formation of the K-Clusters of SNS by K-Means Clustering Technique.

1.2. Identification of Cluster Head:

In the process of creation of WSN, the SNs send the complete information to the BS. The BS initially forms the K-clusters of SNs by K-means clustering technique. The clusters are formed

based on the energy level of SN and the distance between SNs. The K-clusters are formed, and a CH is elected in each cluster. The clusters formed are further subjected to GSO algorithm for optimized clustering. Here, SNs are considered as glowworm (GW), and each GW contains luminance quantity called as luciferin intensity. The intensity of luciferin is determined by residual energy of SN, its distance with CH, and total number of SNs associated with the CH. In the process, each GW is attracted towards neighbor GW based on the luciferin intensity. The SN with highest luciferin intensity will be elected as a CH as shown in Figure 3.

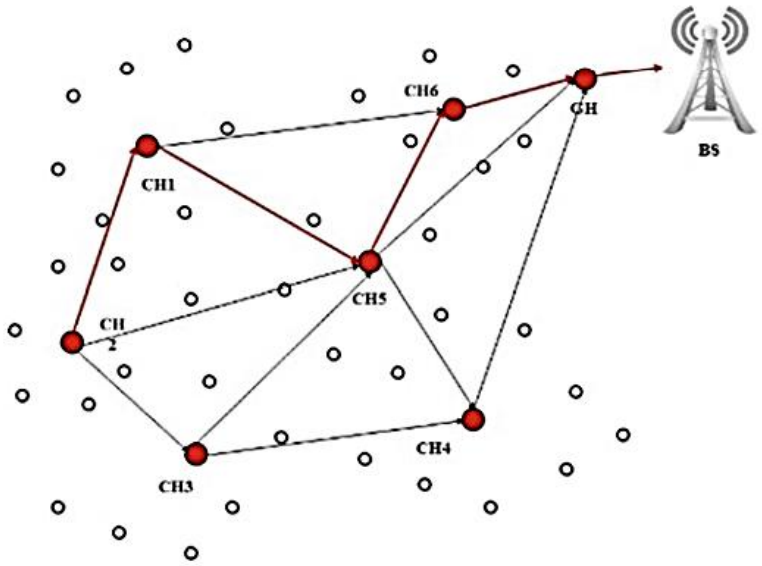

Figure 4: Data Transition of Energy, The Sn Will Be Declared as Dead SN in The Optimized Route in Any Network.

1.3. Routing Process:

After identifying the CHs, the KGMO is used to optimize the routing policy between the CHs and BS. The fitness function of SN determines the intermediate SN to be preferred during the routing process. The fitness function is validated at each iteration process to choose the candidate SN for routing. In this process, the SN with less residual energy will be automatically eliminated in the optimized route. The fitness function of KGMO routing process is determined by the residual energy of each SN the inter-cluster distance, and the density of route.

F (Fitness function) = e + d + n.

where e is the residual energy of each SN, d is the inter-cluster distance, and n is the number of hops. The fitness function determines the optimized route. In this process, the CH with the less residual energy will be automatically eliminated from the optimized path at each round. When the SN reaches a threshold value of energy, the SN will be declared as dead SN as shown in Figure 4.

1.4. Performance Evaluation:

In order to determine the optimized clustering and efficient routing in WSN, the parameters are residual energy, Received Signal Strength (RSS), distance and type of sensors. The residual energy and distance are the factors that affect the lifetime of the WSN. Lifetime/rounds, total no. of active nodes, the dormant nodes, and packet transfer ratio are the metrics for the performance evaluation. The cluster quality determines the energy consumption of the WSN. The efficient routing enhances the lifetime of the network. In general, better the cluster quality and the shortest path determines the efficacy of algorithm.

The algorithm GSO-KGMO-WSN governed by the fitness function and the parameters of fitness function comprises the residual energy, the intra-cluster distance, and the number of hops. The major parameters of the fitness function are also the factors of the performance evaluation. The proposed algorithm is compared with popular energy-efficient algorithm PSO-PSO-WSN and previously reported work PSO-GSOWSN [3]. The outcome of the performance evaluation depicts that having a better control on the fitness function will lead to efficient load balancing among the CHs in optimal routing and energy conservation in forming the compact clusters which in turn lead to the improvement of network lifetime.

2. LITERATURE REVIEW

In WSN, the SNs' limited battery power can be managed by the clustering technique Heuristic Algorithm for Clustering Hierarchy (HACH) was proposed. The HACH algorithm has two main phases such as sleep scheduling and CH selection[4]. The HACH algorithm balances and minimizes energy utilization by choosing distributed nodes with high energy as CH to increase network lifetime, but fails to explain the concept of heterogeneity in terms of energy levels at WSN [5]. The key parameters that play a significant role in lifetime of WSN are energy and computational feasibility where the SNs are resource constrained. Energy consumption primarily depends on age of WSN and the distance from BS and SNs. The distance results in unbalanced usage of energy.

The formation of clustering and intelligent routing concept was introduced through genetic algorithm (GA)[6]. The low-energy adaptive clustering hierarchy (LEACH) is one of the early clustering algorithms for SNs in WSN. The LEACH does not support the random selection of the CHs. The several innovative techniques such as updating of CH at the end of round of data transmission were introduced to improve the lifetime of WSN, but fail to address the issue of end-to-end packet delay [7]. Since WSN functions in the energy-constrained environment, optimized data routing will play a major role. In improved routing algorithm for WSNs using ant colony optimization (ACO), the issue of optimized routing is addressed.

The ACO algorithm was compared with the energy-efficient ant-based routing (EEABR) and leach-ant algorithm to prove the minimum energy consumption, but the major issue of packet delivery ratio was not addressed[8]. The ring communication topology was the early and efficient routing technique in wired network, and the same concept was extended for a heterogeneous WSN to conserve energy in WSN. The energy-efficient heterogeneous ring clustering (E2HRC) algorithm guarantees better average energy consumption. The algorithm is compared with the original IPv6 routing protocol, Low-Power and Lossy networks (RPL).

The issue related to the lifetime of the network was not discussed [9]. The energy consumption and load balancing problems were addressed by introducing the improved routing protocol (IRPL). Here the routing topology control model has been segmented into rings of equal area for better load balancing and balanced energy conservation. The issue pertaining to the packet delay was not addressed [10]. The concept of clustering for data aggregation among SNs and efficient routing data between CHs for energy conservation has not been addressed comprehensively by any of these techniques. The GSO-KGMO-WSN methodology addressed the issue of clustering and routing issue as a cohesive problem through bio-inspired GSO and KGMO concepts.

3. DISCUSSION

The GSO-KGMO-WSN was experimented with 300 sensor nodes and 30 gateways for generating the effective clustering and routing process in WSNs. Assume each sensor node has the initial energy up to 0.5 J. GSO-KGMO-WSN algorithm is verified and illustrates the experimental results for both routing and clustering. For knowing the effective results of the GSO-KGMO-WSN method, it is compared with two existing methodologies (i) PSO-PSO-WSN

and (ii) PSO-GSOWSN. To execute this methodology, the values of the gamma, beta, step size, luciferin decay constant, luciferin enhancement constant.

GSO-KGMO-WSN with two existing methodologies: (i) PSO-PSO-WSN and (ii) PSO-GSO-WSN. Figure 2 displays the alive nodes which are greatly increased compared to two methodologies such as (i) PSO-PSO-WSN and (ii) PSO-GSO-WSN. The network lifetime and the number of transmissions are increased by the maximization of alive nodes.

the total packet sent, compared to an existing method the GSO-KGMO-WSN method transmits the high amount of information at the same time. The PSO-PSO-WSN and PSO-GSO-WSN algorithms have high end-to-end delay so that the amount of transmission becomes small. By increasing the no. of alive nodes and decreasing the number of dead nodes, we directly see that the residual energy is maintained for longer duration compared to other methods. This results in conserving more energy and thus maximizing the network life.

4. CONCLUSION

In this paper, the GSO and KGMO algorithms are introduced; this has improved the performance of clustering and routing in WSNs. Using K-means clustering, centroids are identified which are further optimized by GSO algorithm. The elected CHs are subjected to the KGMO methodology, whose fitness function is based on the residual energy, distance, and the number of hops in a network. The optimal route is established only based on this fitness function. By assigning a minimum threshold for each sensor node, the failure of nodes is eliminated in routing at each iteration. The failure of nodes creates the packet drop among WSN, and it degrades the performance of desired the network. Network lifetime is increased by minimizing the energy consumption among the network and the alive nodes, which is present in the network is increased as well as the amount of packets received by the BS also increased. From obtained results, we conclude that the GSO-KGMO-WSN methodology guarantees better efficiency compared to the other two algorithms: PSO-PSO-WSN and PSO-GSO-WSN.

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AUTOMATIC DEBUGGING APPROACHES FOR FIXATING FAILED SYSTEM PROGRAMS

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ABSTRACT

Fixing broken computer programs entails performing two basic debugging tasks: first, the programmer must recreate the problem; second, the programmer must identify the source of the failure. As a consequence of testing, software debugging is the act of identifying and fixing erroneous statements in a defective program. It takes a long time and costs a lot of money. The word "debugging" relates to the process of locating, analyzing, and correcting faults. Automated methods for locating and correcting erroneous statements in a program may substantially decrease software development costs while also improving overall quality. The methods of fault localization, program slicing, and delta debugging are discussed in this article. It recognizes statistical fault localization tools like Tarantula and GZoltar, as well as others like dbx and the Microsoft Visual C++ debugger, which give snapshots of the program state at different break locations along an execution path. Finally, we should mention that most software development firms devote a significant amount of time and money to testing and debugging. More research is needed to completely automate the debugging process, lowering software production costs, speeding up development, and improving quality.

KEYWORDS: *Automated Debugging, Execution Synthesis, Fault Localization, Program Slicing.*

1. INTRODUCTION

When a computer program fails, a programmer must debug it in order to resolve the issue. This is accomplished by performing two basic debugging tasks: first, the programmer must recreate the problem; second, the programmer must determine the reason of the failure. On the one hand, both duties may result in laborious, time-consuming, and monotonous work, and on the other side, they can be a factor that substantially increases expenses and hazards. The goal of automated debugging is to make finding failure reasons easier.

Software flaws, often known as bugs, pose a significant threat to system stability and dependability. Debugging efforts to identify flaws after a software failure are usually time-consuming and non-trivial. The practice of identifying and fixing erroneous statements in a

defective computer program is known as software debugging. Debugging a program is halting it under certain circumstances and then inspecting the state of the program stack and the values stored in program variables. Breakpoints in your program are used to halt the execution of your program. Breakpoints may be unconditional, stopping your program whenever they are met, or conditional, stopping your program only if a test condition you provide is true.

When software fails, Parnin&Orso identify three tasks that must be completed. Fault localization, which entails locating the program statement(s) that caused the failure, Fault understanding, which entails determining the underlying cause of the problem, and Fault repair, which entails determining how to change the code to eliminate the root cause. The word "debugging" relates to the process of locating, analyzing, and correcting faults[1]. Debugging, according to He & Gupta, is a costly and difficult task that requires a thorough knowledge of the software and is often performed manually by programmers[2]. The cost of software development may be substantially reduced by using automated techniques to identify and fix erroneous statements in a program.

Debugging software in the real world is difficult, tedious, and usually requires a thorough understanding of the code[3]. As a result, researchers have put a lot of work into creating automated methods and tools to help with different debugging chores. The majority of current automated debugging methods simply pick a collection of suspicious statements that may cause failures and rank them in order of suspicion. This article identifies and analyzes the following tools from the literature, concluding with a state-of-the-art in automated debugging.

1.1.Localization of the Fault

The activity of locating the precise site of software defects is known as fault localization[4]. It's a costly and time-consuming procedure. Its success is determined on the developers' knowledge of the program being debugged, their ability to make logical decisions, previous program debugging expertise, and how suspect code is recognized and prioritized for analysis of potential problem sites. One of the costliest, time-consuming, and time-consuming tasks in program debugging is software fault localization [5]. As a result, automated fault localization methods that can direct programmers to the sites of problems with little human involvement are in great demand.

Dbx provides you full control over a program's dynamic execution, including data collection on performance and memory consumption, memory access monitoring, and memory leak detection. Dbx allows you to: Examine a core file from a crashed application; Establish breakpoints; Take a look at your software; Take a look at the call history; Determine the value of variables and expressions; Runtime checking may be used to identify memory access issues, memory leaks, and other issues. Fix-and-continue allows you to change and recompile a source file without having to rebuild the whole program.

The dbx debugger may be used through the command line, the Oracle Solaris Studio IDE, or a separate graphical interface known as dbxtool. Microsoft Visual C++ is a debugger with a graphical user interface (GUI) that enables interactive debugging from the editor window of the Integrated Development Environment (IDE). One of the main drawbacks of this method is that it forces users to devise their own ways to prevent wasting time analyzing too much data. Another major drawback is that it is unable to limit the search domain by prioritizing code based on the probability of harboring errors along a particular execution route.

Measures are dynamic calculation formulae whose output varies based on the situation. Measures are used in reporting when several characteristics are utilized to combine and filter model data, such as in a Power BI report or an Excel PivotTable or PivotChart. The DAX formula bar in the model designer is used to construct measures. Standard aggregation functions,

such as COUNT or SUM, may be automatically generated by utilizing the Autosum feature, or you can build your own formula using the DAX formula bar. Measures with names may be used as arguments in other measures.

A Tooltip feature provides a preview of what the results might be for the total in the present context when you create a formula for a measure in the formula bar, but the results are not immediately produced anywhere else[6]. Because the outcome of a measure cannot be determined without context, you won't be able to view the (filtered) results of the computation right away. A reporting client application that can provide the context needed to obtain the data relevant to each cell and then assess the expression for each cell is required to evaluate a measure. A PivotTable or PivotChart in Excel, a Power BI report, or a table expression in a DAX query in SQL Server Management Studio may all be clients (SSMS).

For each cell in the results, a separate query is performed, regardless of the client. That example, in a PivotTable, each combination of row and column headings, or each selection of slicers and filters in a Power BI report, produces a distinct subset of data over which the measure is computed.

1.2.Slicing of Programs

Program slicing is a method for concentrating on the portions of a program that may have caused the failure. This method produces a program slice—a portion of the program execution that is important for a particular state or action. Slices are made up of assertions that are dependent on each other: If S1 can affect the program state accessible by S2, a statement S2 is dependent on a statement S1[7]. A program slice is formed by the transitive closure over all dependents starting with a statement. When troubleshooting a failed statement, calculating the backward slice returns all statements that may have affected the failure. The difference between static and dynamic slicing is critical. A static slice applies to all potential runs and is therefore calculated without any assumptions about a specific (failed) program run, while a dynamic slice only applies to the failing run and is thus more accurate. CodeSurfer, a commercial tool for conducting static slicing on C programs, is an example of a program slicing tool.

CodeSurfer is a tool for deciphering C and C++ source code. CodeSurfer analyzes a program's semantics and offers advanced queries to help you understand it. It allows you to automatically recognize and explore your program's deep structure: the semantic threads that show how your program operates. CodeSurfer is a software that may be used interactively or programmatically. Indus is another useful tool. At the moment, Indus is made up of three components. Indus is a module that contains the implementation of algorithms and data structures that are common to analyses and transformations that are or will be part of Indus[8]. This module provides interface definitions that are common to most analyses and transformations, allowing different implementations of analyses and transformations to be easily coupled to create systems. The StaticAnalyses module is a collection of static analyses such as object-flow, escape, and dependency studies.

Software development companies use third-party software to supplement their own development to reduce time to market and costs. In reality, at least 90% of businesses utilize third-party software, and 95% of proprietary or bespoke software programs they develop use third-party components[9]. Modern software development programs, in addition to the bespoke application or product development component, draw on a variety of resources to reduce time to market and supplement skills or competencies they may lack. This third-party software comes from three different places:

Open-Source Software (OSS) is software that is developed in an open manner and is released with the source code. COTS (commercially available off-the-shelf) software is software that is

bought from a vendor. These are often bought without needing to be customized. If open source is utilized in this program, the licensee is likely unaware of it. The data is sent in binary format.

The analyses in this module utilize common Indus interfaces and implementations, and new interfaces/implementations unique to new analyses may be defined/provided. Object-flow Analysis (OFA), a points-to analysis for Java, is one of the existing analyses. Escape Analysis is a set of dependency studies that are needed by analyses/transformations such as program slicing and partial evaluation: entry-based control, exit-based control, identifier-based data, reference-based data, interference, readiness, synchronization, and divergence. Side-Effect Analysis, which offers method-level information on side effects; A monitor analysis is a basic analysis that gives information on the monitor/lock graph for a particular system. Atomicity Analysis gives information on atomicity in the given system, whereas Safe Lock Analysis conservatively determines whether a lock (monitors) will not be kept forever [10]. The Java Program Slicer module includes the main implementation of the Java program slicer, as well as adapters that let the slicer to be used in other programs like Bandera and Eclipse.

1.3.Debugging Deltas

Each bug in the database explains a complicated situation that leads to the failure of software. Because they may include a lot of useless information, a lot of bug reports may be the same. Delta debugging is an automated method for turning a test case that produces a problem into basic test cases in which every element of the input is important in recreating the failure, resulting in simplified bug reports[11]. By just examining an output file, it is generally difficult to determine the true reason of the problem. It would be extremely useful in locating the problem if you could simplify the input file and still get the same failure. This method of repeated attempts for decreasing input is automated using the delta debugging technique.

1.4.Synthesis of Execution

According to Zamfir and Candea, debugging actual systems is difficult, time-consuming, and needs a thorough understanding of the code[12]. Developers are compelled to seek for an explanation of how the program might have gotten at the reported failure point since bug reports seldom offer enough information. Execution synthesis is a method for automating this kind of investigation: given a program and a problem report, it generates an execution of the program that results in the reported bug symptoms automatically. It “synthesizes” a thread schedule and other necessary software inputs that cause the issue to appear using a mix of static analysis and symbolic execution[13].

2. DISCUSSION

There are two main stages to fault localisation. The first step is to detect suspicious code that may contain software vulnerabilities using a technique. The second step requires programmers to analyze the indicated code in order to determine if it includes problems. Fault localization has been a hot topic in research, with tools like Tarantula and GZOLTAR being developed to help with the initial step of fault localization. The methodology underlying the described tools, Spectrum-based Fault Localization (SFL), is a statistical debugging technique that depends on code coverage information. Other debugging tools, like as dbx and the Microsoft VC++ debugger, enable users to specify break points throughout the execution of a program and inspect variable values and internal states at each break point. At different break points along an execution route, these tools give a snapshot of the program state. dbx is a source-level interactive command-line debugging tool. It may be used to control the execution of a C or C++ program and to examine the status of a halted program.

The analyses in this module utilize common Indus interfaces and implementations, and new interfaces/implementations unique to new analyses may be defined/provided. Object-flow

Analysis (OFA), a points-to analysis for Java, is one of the existing analyses. Escape Analysis is a set of dependency studies that are needed by analyses/transformations such as program slicing and partial evaluation: entry-based control, exit-based control, identifier-based data, reference-based data, interference, readiness, synchronization, and divergence. Side-Effect Analysis, which offers method-level information on side effects; A monitor analysis is a basic analysis that gives information on the monitor/lock graph for a particular system. Atomicity Analysis gives information on atomicity in the given system, whereas Safe Lock Analysis conservatively determines whether a lock (monitors) will not be kept forever. (3) The Java Program Slicer module includes the main implementation of the Java program slicer, as well as adapters that let the slicer to be used in other programs like Bandera and Eclipse.

We must first define the process before we can explain the algorithm. In general, the delta debugging method is used to deal with situations where a change in one variable may result in a change in program behavior. The term "variable conditions" refers to all of the programs and environments potential behaviors. Delta debugging may also be used to identify failure-causing code changes in programs. If you have two versions of a program, one that works and the other that doesn't, you may use the delta debugging method to find the modifications that caused the failure. Delta debugging may also be used to isolate failure-inducing thread schedules, according to Choi & Zeller, 2002. The delta debugging method can narrow down the differences between two thread schedules and identify the places where a thread transition causes the program to fail given a thread schedule for which the concurrent program works and another for which the program fails.

In a normal debugger, such as GDB (the GNU DeBugger), the synthesized execution may be played back deterministically. It's used to troubleshoot code that's been compiled using GCC (the GNU Compiler Collection). It's an extremely capable debugger that can debug even the most complex applications. This is very helpful for troubleshooting concurrency issues. Because our method does not need any runtime tracing or program changes, it has no runtime overhead and is suitable for usage in production systems. We test ESD, a debugger based on execution synthesis, on popular software (e.g., the SQLite database, ghttpdWeb server, HawkNL network library, and UNIX utilities): ESD reproduces many genuine concurrency and memory safety issues in less than three minutes, beginning with only bug reports.

3. CONCLUSION

Debugging is described in this article as laborious, time-consuming, dull, and costly. It is noted that, despite all efforts and scientific advancement, contemporary software still includes flaws that cause not only minor inconveniences but can have a negative economic effect. As a result, methods to aid in the debugging of software systems are still required. Both recreating the failure and locating the fault may be a difficult and dangerous task. The goal of automated debugging is to make finding failure reasons easier. Most software development firms devote a significant amount of time and money on testing and debugging. More research is needed to completely automate the debugging process, lowering software production costs, speeding up development, and improving quality.

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A COMPREHENSIVE REVIEW ON INDOOR AIR QUALITY MONITORING SYSTEM FOR HUMAN HEALTH

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ABSTRACT

Indoor air quality is a phrase that describes a building's air quality, with a focus on the health and comfort of its inhabitants. It describes the characteristics of the conditioned air that flows throughout the space/area in which we work and reside. Microbial pollutants (molds, fungus) that are mainly reliant on the room's temperature and humidity, gaseous contaminants (such as carbon monoxide, carbon dioxide, volatile organic compounds, and so on), and dust particles or aerosols may all have an impact on IAQ. Building occupants may be exposed to pollutants that are harmful to their health. To avoid such negative consequences, an air quality management system is critical. It also includes a critical examination of microcontrollers utilized in system architecture as well as difficulties in developing real-time monitoring systems. For researchers, this article also offers some fresh concepts and possibilities in the area of IAQ monitoring.

KEYWORDS: *Air, Dust, Indoor, Pollution, Sensor, Health Care, Contaminants, Awareness.*

INTRODUCTION

In various areas of the globe, air-conditioning systems are utilized. Most systems are designed to offer thermal comfort and an acceptable level of indoor air quality for occupants. Occupants are demanding a more pleasant and healthy indoor environment as their quality of life rises. People spend 80-90 percent of their time inside, and the indoor environment has a significant impact on human health and job performance. The interior environment is mainly influenced by temperature, humidity, air exchange rate, air movement, ventilation, particle pollutants, biological pollutants, and gaseous pollutants. According to recent study, the incidence of sick building syndrome (SBS) in buildings with air conditioning systems rose by 30 percent to 200 percent when compared to buildings with natural ventilation systems. Legionnaires' disease has also claimed the lives of people in air-conditioned buildings. Furthermore, both of these mishaps are indicative of indoor air quality problems caused by AC systems. Even if current standards can be fulfilled, many air-conditioned and mechanically ventilated buildings still have problems with the interior temperature[1].

One of the consequences of the global energy crisis of the 1970s was the public awareness of the need of energy conservation. Since then, buildings have become more airtight, and insulation materials have been used to minimize energy loss through the building envelope. Fresh air is restricted in air-conditioning systems in order to reduce energy usage. Meanwhile, synthetic materials and chemical products are in demand. Many researchers have looked at IAQ management techniques in order to reduce indoor pollutants' concentrations and improve IAQ[2]. This article will cover recent research on air-conditioning systems and indoor air quality management for human health. Indoor air settings must satisfy thermal comfort and indoor air quality (IAQ) requirements. Thermal comfort is influenced by a number of factors, including air temperature, air humidity, air velocity, mean radiant temperature, human apparel, and activity levels. Air conditioning is widely used, which helps to improve thermal comfort, but poor IAQ-related health problems are increasingly common[3].

Indoor Air Quality

Indoor particle pollution sources may be classified into two categories: indoor pollution sources and outdoor pollution sources, with varying concentrations and compositions of indoor particle pollutants. Particles produced by indoor pollution sources (e.g., cooking, smoking) in residential buildings were mainly fine and ultra-fine particles, accounting for approximately 80% of the particles in terms of particle counts. The main components of PM2.5 and their mass proportion within dwellings include organic carbon (40-60%), nitrate (13-14%), trace elements (11-12%), ammonium (8%), elemental carbon (6%), and sulphate (6%). (4 percent). The main composition of PM2.5 and mass percentage at schoolroom locations is organic carbon (26-50 percent), nitrate (20 percent), trace elements (22 percent), elemental carbon (6-7 percent), and sulphate (6-7 percent). According to the results, organic carbon is the biggest contributor to PM2.5 and has the greatest impact on the features of organic carbon-containing PM2.5.PM2.5, which not only permits but also encourages the spread of germs. The degree of damage caused by particle pollutants to the human body is determined by chemical characteristics, diameter size, and quantity. The chemical characteristic of particle pollutants is the most important factor to examine since it determines the degree and rate of biochemical processes engaged and disturbed by particulate pollutants in the human body. The majority of particle pollutants in the air are extremely fine. They have a hard time relaxing without being discovered. Inhaled air, on the other hand, allows them to easily reach deep into the respiration channel. Furthermore, the surface of particle pollution may collect harmful chemicals, fluids, and germs, increasing the harm to the human body[4].

Primary Gaseous Pollutants:

CO, CO2, SO2, NOX, O3, radon, and VOCs are the most common primary gaseous contaminants. Chemical compounds have lately become quite popular inside. Chemical goods may release a variety of chemical contaminants at room temperature, with VOCs being the majority of these chemical pollutants. VOCs may produce a variety of symptoms, including headaches, eye, nose, and throat irritations, dry cough, dizziness and nausea, and fatigue. VOCs can have negative effects on the respiratory, cardiovascular, and neurological systems. Furthermore, VOCs have the potential to cause cancer[5]. The physical and chemical properties of VOCs have piqued the interest of many academics, and they have become a focus of research. Indoor emission sources of VOCs include mainly construction materials, decorative materials, and items used inside[6].

Secondary Gaseous Pollutants Include The Following:

As a result of chemical reactions, the mix of contaminants in interior environments may be altered. Reaction Indoor secondary pollutants such as free radicals, aldehydes, ketones, alcohols, carboxylic acids, and fine particulate matter are produced by the reaction of ozone with certain

unsaturated hydrocarbons. Many studies on indoor secondary pollution caused by ozone interacting with limonene have been performed in recent years. The importance of radical hydroxyl in indoor changes has been confirmed. The hydroxyl radical is a byproduct of the ozone/terpene interaction that reacts with other substances. The hydroxyl radical is generated by a significant percentage of oxidized materials, including some products, and cannot be produced only via ozone routes. Chemical reactions that take place on indoor surfaces. Such reactions may have a larger impact on IAQ than those that occur in the gas phase due to the high indoor surface to volume ratio. The impact of secondary pollutants on building occupants. In evaluating the impact of secondary pollutants, the inability to quantify many of the reaction products is a major drawback. Sensory measurements may assist identify changes in indoor chemistry and alterations that aren't detected by the analytical techniques that are often used to assess indoor air. Secondary pollutants in the home have a significant influence on human health and comfort, but the extent of the impact and frequency of occurrence are unclear at this time. Furthermore, many secondary pollutants cannot be estimated owing to the complexity of the composition, therefore it is critical to raise the measurement standard[7].

Monitoring Of the Environment

The circumstances of environmental monitoring in houses have been examined. The author proposes a monitoring paradigm based on a mix of ubiquitous distributed sensing units, data aggregation information systems, and reasoning and context comprehension for temperature, humidity, and light intensity. The sensor data accuracy seems to be promising. Many monitoring methods have lately been suggested for environmental pollution management. Meanwhile, some of the control systems are specifically designed for CO2 monitoring. A monitoring system is being created to provide information on carbon dioxide concentrations in distant locations. The temperature, humidity, and light intensity of the outside detection range are also reported by the system. Similarly, the author proposed an urban CO2 monitoring system in. The technology is used outdoors in a 100-square-kilometer metropolitan area. The first is severe pollution, which has resulted in atmospheric deterioration, climate change, stratospheric ozone depletion, biodiversity loss, changes in hydrological processes and fresh water supplies, land degradation and food production system stress, acid rain, and global warming. Lung cancer, pneumonia, asthma, chronic bronchitis, coronary artery disease, and chronic pulmonary illnesses are all known to have risen as a result of some of these chemical pollutants. As a result, environmental pollution monitoring is becoming more popular[8].

Gas Sensors:

The whole front interface of experimental IoT systems is made up of these. And those are the state's so-called "Products." Their primary function is to gather environmental information about the environment (sensors) or to transmit data to the environmental. Low-cost microchip sensors are suitable for use in an array for low-cost environmental pollution monitoring systems. With more temperature, pressure, and relative humidity sensors, quite an array may be extended to detect pollutant concentrations as well as other physical characteristics, with better gas sensor calibration. Nevertheless, there have been no gas sensors that can detect a single gas with 100% accuracy. As a result, procedures that categorize gases using analytical techniques must be employed. Instruments such as Fourier transform infrared (FTIR) analyzers, gaseous chromatographs, and mass spectrometers are samples. The circumstances of environmental monitoring in houses have been examined. The author proposes a monitoring paradigm based on a mix of ubiquitous distributed sensing units, data aggregation information systems, and reasoning and context comprehension for temperature, humidity, and light intensity. The sensor data accuracy seems to be promising. Many monitoring methods have lately been suggested for environmental pollution management. Meanwhile, some of the controllers are specifically designed for CO2 monitoring[9].

IAQM (Indoor Air Quality Monitoring) Systems Are Used To Monitor The Quality Of The Air Within A Building:

The growing health problems caused by IAP are now a hot topic among academics all around the globe. Some experts proposed IAQ monitoring systems for a better living environment using sophisticated sensor networks and communication technology. It is impossible to evaluate all current and planned IAQ monitoring systems in this article since researchers are actively researching in this area to enhance building health. Nonetheless, research based on the most important IAP characteristics are included in this section. We chose monitoring systems that provide online access to recorded environmental variables or produce SMS-based warnings since automated alert systems are essential in our hectic schedules.

Although many methods for real-time monitoring have been developed, the Wireless Sensor Network and Internet of Things-based models were chosen to be evaluated due to their growing importance in the Industry 4.0 revolution. Created a low-cost ZigBee sensor network architecture for real-time IAQ monitoring Installing four sensor nodes in an indoor setting and collecting data for more than four weeks is conceivable. The ambient data was then transmitted to a ZigBee communication protocol for analysis[10]. The authors of this study looked at CO2, benzene, NOx, and ammonia levels in the kitchen while cooking, while additional sensors gathered data from the bedroom, living room, and workplace. It offers real-time monitoring of all variables that contribute to indoor air quality; nevertheless, there are still a few improvements that may be made to this system, such as lowering power usage and increasing the accuracy of measured data.

Systems based on WSN

The majority of researchers in the last few years have worked on WSN-based designs using ZigBee as the most reliable communication protocol, according to the trends in the development of IAQ monitoring systems. The real-time data gathering is handled by the AT mega microcontroller; however, the Raspberry Pi is another popular option for setting up a sensor network in the target area. WSN stands for Wireless Sensor Network, and it is a kind of Ad Hoc Network in which sensor networks use a lot of energy while sending data across many hops. It was discovered that sensors take a long time to transmit a signal to the monitoring device. Researchers have to concentrate on battery power management in these circumstances to enhance overall system performance. However, just a few academics have used WSN architecture to build energy- and cost-saving monitoring systems. Most WSN-based IAQ monitoring systems utilize web servers as data access platforms, which necessitates extra effort to produce real-time warnings on user cellphones to avoid dangerous situations.

Iot Based Systems

IoT monitoring systems are thought to be the most dependable options for IAQ measurement because to their long battery life and reliable one hop connectivity capabilities. These systems need less maintenance work due to their reduced latencies and low energy consumption. Smart systems are IoT-based real-time monitoring systems; as a result, most academics and industrial manufacturers are drawn to this design. According to experts, the IoT system for monitoring a huge variety of factors while maintaining system performance. With effective IoT architectural design, studies carried out provided IAQ monitoring systems a new edge. However, relatively few academics have focused on prediction algorithms in the area of IAQ monitoring in recent years. According to studies, combining IoT monitoring systems with machine learning and deep learning networks makes it much simpler to make accurate prediction choices. For new age researchers, it is a major field of study.

Other Technological Innovations

Some researchers experimented on architectures other than WSN and IoT, however few characteristics indicate their poor performance when compared to the real-time monitoring capability of IoT systems. The most important drawback of the C-Air platform given by Furthermore, these researchers focused on low-cost sensors where calibration is a big problem, resulting in a lack of overall design performance. Similar limitations were discovered with the method used, which included solely studying the system on breadboards in a controlled lab setting. Attempts to construct a prediction model with a CAN interface were made, but the research was once again restricted to PM levels alone; the effect of additional contaminants was not taken into account. A useful research using FOOBOT monitors, and they took into account various IAQ parameters for real-time analysis, however sensor calibration was once again a significant problem to guarantee desired results.

DISCUSSION

The main need at this time is to conduct real-time monitoring of IAQ parameters and provide warnings to building occupants in order to prevent dangerous situations. The Internet of Things method offers a lot of promise in this area since it uses less power, has less time delays, and has a greater capacity to connect with the real environment. The increasing cost and huge power consumption of sensor nodes are two major issues in the development of IAQ systems. When it comes to real-time IAQ applications, sensor units are often found in industrial settings, as well as within homes, workplaces, and outdoor locations. However, the design of the sensor unit in all of these situations necessitates a greater emphasis on size, design cost, power consumption, network protocols, and performance sensitivity to temperature and humidity changes. Future researchers will face the most difficult issue in ensuring reliable real-time monitoring: sensor calibration. Although, as compared to optical and electromechanical sensors, Metal Oxide Semiconductor sensors are less expensive.

CONCLUSION

Air quality was monitored in real time using commercially available WSN motes, gas sensors, and dust monitors. In Java, a sensor data collection module and a toolkit were created. It gathers raw sensor data, parses it, extracts the IAQ data, and saves it in a sensor database. IAQ parameters are published in the Context Aware Setting so that the HVAC control application may obtain the information by subscribing to the IAQ parameters in question. The Air Quality Index was created to identify the health effects of air pollution on the environment. Experiments were conducted utilizing the existing indoor air quality monitoring system under different climatic conditions. The gadget operated in accordance with the circumstances and gathered sufficient amounts of data on air quality in real time.

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ON THE ISSUE OF THE CLASSIFICATION OF INTERNATIONAL STANDARDS OF JUSTICE (PRE-TRIAL STAGE)

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ABSTRACT

The article discusses the issue of the possibility of classifying international standards of justice at the pre-trial stage. The views and opinions of various scientists on this topic are critically analyzed, outlining the author's position on this issue, which causes certain disagreements in the scientific community. An attempt is made to classify the aforementioned international standards on its own.

KEYWORDS: *International Standards of Justice, Pre-Trial Stage, Classification.*

INTRODUCTION

The issue of the classification of international criminal justice standards, in our opinion, has been studied by legal researchers from various positions, sometimes very contradictory ones.

Thus, an attempt at such a classification was made by N.V. Spesivov, who differentiates international standards according to several main features.[1]

We believe it is possible to agree with the opinion of the mentioned author, who notes: "... international standards of criminal proceedings ... are organically linked to general international standards for the implementation of criminal procedural activities, correlate with them as a part and a whole, and cannot be considered in isolation, in isolation from each other"[2].

At the same time, however, the classification of such international standards proposed by N.V. Spesivov seems to be unacceptable in some part.

So, this researcher suggests: "... depending on the obligatory source, it is possible to single out international standards for the implementation of criminal proceedings ... contained in mandatory international acts and contained in international advisory acts"[3].

Accordingly, this author refers to the first group the standards enshrined in bilateral and multilateral treaties (conventions, pacts, agreements, treaties), the customs of international law, as well as the orders of international bodies created on the basis of international treaties (for example, in the resolutions of the UN Security Council) ...

In addition, N.V. Spesivov includes the Convention on the Rights of the Child, the provisions of the International Covenant on Civil and Political Rights, other international multilateral treaties concluded by the UN, as well as other regional multilateral treaties among such binding international acts.

At the same time, the aforementioned researcher himself, contrary to the previous statement, indicates that "The standards of individual rights contained in these acts, which in their essence perform the function of general principles of international law, are inherent in the main declarative nature"[4].

Thus, since the declarative nature of an international act presupposes the absence of its imperative and binding nature, the classification of international standards according to this principle does not seem entirely justified.

Moreover, this differentiation, according to the author of this study, contains an incorrect initial premise: it implies the obligation, imperativeness of international acts. Meanwhile, as we indicated earlier, such views lead to infringement of the basic principles of state sovereignty, provide for the likelihood of interference in the internal affairs of the state[5].

Accordingly, the classification of international standards of justice on this basis seems to be incorrect.

Likewise, since legal custom does not have a written form (tacitum pactum), the inclusion of its provisions in the proposed classification seems more than doubtful.

It seems a contradiction to N.V. Spesivov's assertion that the established international legal custom, which is not enshrined in a clearly defined contractual form, can give rise to obligations of states[6].

We believe it is possible to agree with the proposed by N.S. Yermishina differentiation of international standards of the rights of participants in criminal proceedings by scope, dividing them into universal and regional international standards[7].

In this case, universal standards are understood as treaties concluded between states located in different regions of the world. Most often, such treaties are concluded in the form of conventions open for accession.

In turn, as the name implies, regional international standards of individual rights are formed between states that are historically and geographically close to each other.

As an example of such regional standards, one can cite the standards of the CIS member states, European, Inter-American, etc.

The point of view of N.V. Spesivov that "... it is inappropriate to classify international standards for the implementation of criminal proceedings ... into the standards of trial and pre-trial proceedings is controversial. ... Everything that is obligatory for the court is also obligatory during the preliminary investigation"[8].

It seems that international standards of trial and pre-trial proceedings, for all their similarity, overlap, but still do not coincide in full.

In particular, of the six indicators provided for, for example, the Bangalore Principles of Judicial Conduct[9], five directly relate and apply to the activities of the relevant state bodies at the pre-trial stage of the criminal process: objectivity, honesty and incorruptibility, observance of ethical standards, equality, competence and diligence.

However, the question of the independence of such bodies in the exercise of their powers seems to be controversial.

So, if for the court the issue of independence is a cornerstone, the absence of which makes the very meaning of judicial consideration to nonsense, then for the bodies carrying out preliminary investigation (for the Republic of Uzbekistan, not only inquiry and preliminary investigation, but

also pre-investigation check are seen as such), staging the question of such independence would, in our opinion, not be entirely correct.

First of all, granting the aforementioned bodies full independence would imply denying the possibility of proper control over their activities (including judicial), which, given the specifics of their activities, would give rise to the likelihood of arbitrariness and violation of individual rights.

Similarly, the difference between international standards of trial and pre-trial proceedings is seen from the Basic Principles on the Independence of the Judiciary, adopted by the Seventh United Nations Congress on the Prevention of Crime and the Treatment of Offenders, held in Milan from August 26 to September 6, 1985, and approved by UN General Assembly Resolution 40 / 32 dated November 29, 1985[10].

In addition to the already mentioned main difference - the independence of the courts, this international legal act also provides for a special procedure for punishment, dismissal and dismissal of judges.

So, clause 19 of the Basic Principles reads: "All procedures for punishment, removal from office and dismissal should be determined in accordance with the established rules of judicial conduct"[11].

A similar procedure is established in the Guidelines on the Role of Prosecutors adopted by the Eighth United Nations Congress on the Prevention of Crime and the Treatment of Offenders.

In particular, paragraph 22 of the Guidelines directs that “Disciplinary proceedings against prosecutors guarantee an objective assessment and an objective decision. It is produced in accordance with the law, the Code of Professional Conduct and other established standards and ethical norms, and in the light of these Guidelines"[12].

In practice, this means a special procedure for resolving such issues, most often - by the judicial authorities themselves. In the Republic of Uzbekistan, these issues are resolved by the Supreme Judicial Council. Thus, article 6 of the Law of the Republic of Uzbekistan "On the High Judicial Council", among the main tasks of the Council are also "... taking measures to prevent and early detection of corruption among judges; consideration and principled assessment of each revealed fact of corruption in the judicial system; ... consideration of the issue of bringing judges to disciplinary responsibility, as well as giving an opinion on bringing them to criminal liability"[13].

Of course, one of the most important signs of the difference between trial and pre-trial proceedings is publicity. This feature is almost always characteristic of judicial proceedings (for rare cases stipulated by the criminal procedure law) and to a lesser extent relates to the activities of state bodies at the stage of pre-trial proceedings, which is due to their specifics.[14]

Thus, we believe that it is possible to differentiate international standards for the implementation of criminal proceedings into the standards of trial and pre-trial proceedings.

The next criterion for the possible classification of international standards for the implementation of criminal proceedings is their differentiation depending on the degree of distribution.

In particular, according to this criterion, it is possible to divide international standards of justice into general and special ones.

Of course, general and specific standards are closely related; the elements that make up their content intersect. At the same time, the content of general standards is filled with individual, special content, made more specific in relation to which minor participant in the process this standard is applied to.

It is difficult to agree with the point of view of O.V. Gladysheva, who classifies international standards of justice, limiting herself to only two features: I) recognition, protection and protection of the rights and freedoms of the individual, understood by the international community as fundamental; 2) restriction of fundamental rights and freedoms of the individual in criminal proceedings only according to special rules recognized by the international community as admissible[15].

Such a formulation of the question seems to be unreasonably general, which does not allow revealing the essence of the phenomenon under study.

Also, the classification proposed by E.V. Skoba is assumed to be quite general, which, when classifying international standards, actually focuses only on the sources of international law: "... 1) generally recognized international principles, norms and standards concerning criminal proceedings; 2) the norms of universal and European treaties to which the Russian Federation is a party; 3) norms of agreements adopted within the framework of the CIS; 4) norms of bilateral interstate, intergovernmental and interdepartmental treaties of the Russian Federation" [16]

The point of view of A.A. Kovalev is not entirely acceptable and gives rise to serious doubts: "The very meaning of the system of international human rights standards is that the fundamental rights and freedoms of the individual should prevail over national sovereignty"[17].

As we have already noted more than once, such a formulation of the question is not entirely definite and its free interpretation in the direction of infringement of the sovereignty of states is possible.

Accordingly, in attempts to systematize and classify international standards in the field of human rights in general and in terms of the administration of justice at the pre-trial stage of the criminal process in particular, in our opinion, possible differentiation on the basis of imperativeness should be excluded.

So, in this regard, the position of the American scientist D. Donelli, who singles out four groups of standards depending on such a criterion of imperativeness, seems to be insufficiently correct; binding standards; standards that allow states to make exceptions, for example when signing treaties with reservations; various kinds of recommendations that are optional; national standards that apply in the absence of prepared international standards[18].

Accordingly, according to the classification of this author, the free expression of the will of states is possible only in the absence of general standards or the assumption that they are not imperative on the part of some abstract supranational law, which, in our opinion, is unacceptable. Similarly, the German author T. Bonacket is guided by the existence of "universal regimes in the field of human rights." At the same time, according to this researcher, the importance of such "regimes" is important for the so-called symbolic integration of various states into the world community, which is understood as the process during which unification takes place on the basis of a common interpretation and understanding of human rights.

According to T. Bonacket, the evolution of the international community leads to a change in the doctrine of unlimited sovereignty, the emergence of the concept of a general social order[19].

Brütsch goes even further, arguing that the "universal" provisions of international law (standards) act as "objective law", which is formed as a universal desire and will of the international community, focused on the operation of such norms as a law to which the state can only actually obey ... At the same time, as a strict requirement, it is formulated that even if this norm is not embodied in national legislation, the state will have to follow this standard, "tolerate" this standard. Accordingly, this researcher proclaims the emergence of a new type of law - law beyond the state[20].

The American researcher D. Forsyth says that the basic standards in the field of human rights represent the transformation of innate human rights into the norms of international law, which should seriously affect national legal systems and, in general, global politics[21]

In our opinion, the point of view of A.V. Stremoukhov is interesting, who classifies general international human rights standards into six groups: 1) innate (inalienable, elementary, natural, inalienable), 2) civil, 3) political, 4) economic, 5) social and 6) cultural rights. These human rights groups are proclaimed and enshrined in three major international legal acts: the Universal Declaration of Human Rights of December 10, 1948, the International Covenant on Economic, Social and Cultural Rights of December 16, 1966 and the International Covenant on Civil and Political Rights of 16 December 1966[22].

Considering the named groups of rights in relation to the Universal Declaration of Human Rights, this author notes that the first group - innate human rights and freedoms, the Universal Declaration includes: the right to life, liberty and security of person, the right to freedom from torture, the right to protection the law against interference in the privacy of a person and from encroachments on the inviolability of his home, the privacy of correspondence or on honor and reputation, freedom of movement and choice of residence, the right to leave any country, including one's own, and return to one's own country.

This correlation raises certain doubts. So, while agreeing with the inclusion in this list of such rights and freedoms as the right to life, liberty and security of person, the right to freedom from torture, it still seems that other rights included in this list can hardly be attributed to innate rights. and freedom.

We believe that the concept of "born", understood as "inalienable", implies in practice the impossibility of their limitation both by other persons and by the state.

Meanwhile, the rights to inviolability of home, privacy of correspondence, freedom of movement and choice of place of residence, the right to leave any country, can be lawfully limited by the state.

S.M. Yagofarov singles out a group of international standards, which can be characterized as development standards, "... the main purpose of which is to correct the directions of development of the criminal procedural legislation of states on the basis of existing standards and to overcome possible contradictions associated with their varied application based on the creation of a common concept"[23].

Special international standards, in our opinion, are aimed at establishing rules of conduct in relation to certain groups of participants in the criminal process at its pre-trial stage.

In particular, such standards can be established (and for the most part are established) in relation to ensuring the protection of the rights and freedoms of persons suspected and accused of committing a crime; in relation to persons who have suffered material or moral damage (victims) by a crime; in relation to representatives of judicial and other state bodies (courts, judges, prosecutors, investigators and interrogators).

Separately, one can single out international standards of justice in relation to vulnerable groups of the population: minors, women, persons with disabilities, etc., for which special, separate rules for participation in the criminal process can be established, especially at its pre-trial stage.

Thus, we believe it is possible to conclude that international criminal justice standards can be classified into several groups:

- By field of activity: universal and regional;

- By subjects: applicable to all participants in the process (general) and to their individual groups (special);

- By stages of the criminal process: related to the trial and pre-trial stages.

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EDUCATION OF SPEECH CULTURE IN RUSSIAN LANGUAGE LESSONS

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ABSTRACT

The following article is devoted to the problem of declining speech culture among the youth. Here, the most frequent mistakes occurring in speech are discussed and ways to eliminate them are proposed. Particular attention is paid to the issue of improving the speech culture of schoolchildren, as especially during this period, the formation of the personality takes place, the concept of human culture is formed, and speech patterns of the individual's behavior are worked out.

KEYWORDS: *Speech Culture, Good Speech, Correctness and Purity, Appropriateness and Logic of Speech, Norms of the Literary Language, Language Errors, Orthoepic Deviations, Accentological Errors; Lexical Errors.*

Man is born with inclinations
Which the teacher should develop
Mark Fabius Quintilian

INTRODUCTION

The language of the people is its historical memory, it is its genetic code, which has found its expression in the word. The centuries-old spiritual culture, the entire treasury of Russian literature from oral folk art to classical and modern works of art, the entire life of the Russian people are contained in the word. Accordingly, the word is the reflection of the culture of the nation, by which the whole nation and its representatives are judged.

Speech culture in its traditional sense is the degree of knowledge of the literary language (orthoepic, word-formation, morphological, lexical, syntactic, stylistic norms) in order to make the most comfortable and effective communication in various circumstances. Undoubtedly,

every educated person should be able to evaluate speech behavior - his own and the interlocutor's, correlate his speech with a specific situation during communication.

However, especially now, when there are all opportunities for mastering the norms of the literary language competently, when speech culture is represented by a colossal richness of expression, the question of the disadvantage of speech culture is being raised more and more severely. Fictional works of classical literature are considered out-of-date, among young people there is an opinion that these works are boring, irrelevant, that they are morally and historically outdated and cannot teach anything. Consequently, there is no need to read them (if there is an urgent necessity to familiarize themselves with these works, schoolchildren can resort to watching the film adaptation of this or that work or reading its plot on the Internet). The literate speech of different individuals is sometimes perceived as aggressive behavior towards the rest of the class of society, ignorance of the norms of the native language is not perceived as something bashful. People of the older generation sometimes do not understand young people at all, whose speech is replete with distorted words, abbreviated constructions, and modern borrowings. Different generations are increasingly disconnected, as they lose the ability to communicate with each other. Especially for this reason, today the urgent problem is to increase the speech culture and the development of the communicative aspect of youth. Since the degree of proficiency in speech culture determines the level of our literacy, speech can be called the business card of a person, showing the society who is in front of him: a child or an adult, a person with or without higher education, a professional in his field or an incompetent worker.

Unfortunately, it should be admitted that the current linguistic environment surrounding us does not meet the standards of the literary national language. Internet, mass media, numerous talk shows cannot be examples of exemplary texts of the Russian literary language. Today's youth is in such a speech environment when there is no need to refer to dictionaries, reference books, encyclopedias, to the texts of works of art that make up the golden fund of world culture. They can find all the information they need in “ready-made homework assignments”, “Russian literature in a summary”, “a compilation of the best cheat sheets for preparing for the Unified State Exam (ЕГЭ)”, etc.

Many linguists note the linguistic degradation of modern schoolchildren, since the speech supply of the younger generation is becoming more and more scarce, statements are becoming more simple, constructions are less and less figurative, associative rows are getting poorer and more monosyllabic.

Statements mentioned above lead to the need for a new approach to the selection of material for work in the classroom.

Working on the development of speech culture uses different groups of techniques and types of speech exercises, including vocabulary work, work on a phrase and a sentence, logical work and training in nature. Various types of essays are used.

The usage of vocabulary work and various types of speech exercises develops the speech activity of students, enriches word stock, students' essays become more expressive and emotional. The development of students' speech will be more effective provided that all kinds of speech exercises are systematically and purposefully used in Russian lessons.

The modern system of work on the development of the students’ speech culture singles out as the main task the formation of the ability to perceive and reproduce the text, as well as create their own statement in oral and written form consciously. In order to solve this problem, it is recommended to create speech situations that are as close as possible to the natural conditions of communication. In this case, the speech activity of student’s increases, their high motivation in learning is ensured.

When improving the speech of students, great attention should be given to such aspects as logic, accuracy, clarity, expressiveness and correctness of speech. Accuracy of speech presupposes the ability not only to skillfully convey the facts of observation, but also to find the best language means.

The most important conditions for successful work on the development of speech culture in the lessons of the Russian language, literature and after school hours, in our opinion, are as follows:

- A variety of methods used to develop oral and written speech;

- The implementation of a consistent connection between educational and extracurricular activities for the development of students' speech, both in the content of the studied material and in the ways of its presentation;

- Systematic enrichment of the students' vocabulary.

Through activating students' interest in the subject as a whole, developing speech literacy in the classroom and in extracurricular activities, as well as purposefully and systematically using various ways of developing oral speech, it is possible to qualitatively improve the level of students' speech culture, particularly, good speech.

Good speech is, first of all, correct speech. The correctness of speech is assessed in terms of its compliance with modern language norms. To promote familiarization of students with the current language norms, to educate them with the necessary speech skills in this regard is one of the urgent tasks of language teaching at school. The correctness of speech is a mandatory, but not the only indicator of its culture. Along with the task of writing and speaking competently, correctly, as the given cultural environment dictates and demands, there is another task - to write and speak skillfully, masterfully. Skillful speech is characterized by such features as clarity, accuracy, consistency, stylistic consistency, expressiveness.

There are different degrees of speech proficiency. Undoubtedly, it is difficult to educate from every student an incomparable master of the word. However, possession of a certain level of oratory is not only available to anyone, but is also necessary in order to be a full member of society, actively participating in social activities and comprehensively manifesting oneself as an individual. This level presupposes the ability of the addressee to select linguistic means, taking into account a exact speech situation, the ability to avoid ambiguity, tautology, complicated constructions, which are hardly perceived by the addressee, and also take into account the degree of perception of information by the addressee.

Education of oral speech culture is one of the directions in the general system of work on the development of speech. It is carried out with the help of methods of observation and analysis of linguistic phenomena and independent work of students in the form of a variety of exercises. Among teaching methods, the followings are the most effective: using a reading and pronunciation pattern; phonetic-spelling and phonetic-stylistic analysis of oral performances of students from the point of view of expressiveness and orthoepic correctness.

So, for example, when studying the spelling of vowels in the stressed and unstressed position, students can be observed and asked the following questions-tasks: how is the vowel "***О"*** pronounced in the words "***ТОЛПА"*** и "***ТОЛПЫ"***? What's the difference? How is the vowel ***А*** pronounced in the words "***ШОКОЛАД", "ОСТАНОВКА", "АКВАЛАНГ"?***

After a series of similar exercises, students come to the conclusion that an unstressed "***О"*** in the position before the stressed syllable is pronounced in the same way as the vowel "***А"***, and in the position after the stressed syllable it can reduce the sound to zero. In the process of exercises that require the establishment of a vowel in an unstressed position in these words, the correct

pronunciation of this vowel sound, the ability to apply the rule is consolidated, the skill of correct pronunciation of words is developed as well.

One of the common problems with pronunciation acts is the lack of knowledge of the pronunciation rules for hard and soft consonants in specific words. When studying the way to designate the softness of consonants in writing (using the letters "***Е", "Ё", "Ю", "Я", "И", "Ь"***), lexemes with variable pronunciation of hardness or softness should be included in the exercises, for example: ***"ДЕКАН", "ТЕРРОР", "СЕССИЯ"***. It is expedient to mention that the subsequent letters "***Е", "Ё", "Ю", "Я", "И", "Ь"*** do not always denote the softness of the pronunciation of a consonant sound ("***КОМПЬЮТЕР", "СВИТЕР", "ЖЁЛУДЬ", "ЖЮРИ", "ЖИЗНЬ", "ТУШЬ"*** etc.).

Sometimes, mistakes are made in the process of pronouncing voiced and voiceless consonants, more often this happens during the initial study of the Russian language or the study of Russian as a non-native learner. Attention should be paid to the process of voicing or stunning such sounds in individual words and the discrepancy between their pronunciation and writing ("***ПРОСЬБА", "ВОКЗАЛ", "СДАЧА", "ГОД", "ГРИБ", "МОЛОДЕЖЬ"***, etc.). It is also necessary to clarify the cases of inconsistency in the spelling and pronunciation of the letter "***Г"*** when declining an adjective, a numeral, a pronoun in genitive and accusative cases (**"*БОЛЬШО[В]О", "СИЛЬНО[В]О", "ПЕРВО[В]О", "МОЕ[В]О",*** etc.).

According to practice, a sufficient number of students do not know the pronunciation norms of the combinations ***"ЧТ", "Ч"*** ;, the combination required for pronouncing "***ШТ", "ШН"*** in particular words ("***[ШТ]О", "КОНЕ[ШН]О", "ЯИ[ШН]ИЦА", "СКУ[ШН]О"***) seems strange or funny for them. When working out this rule, that are an exception to this rule should be included in the exercise of words (***НЕЧТО, ЧТЕНИЕ, БУЛОЧНАЯ, ЧТОБЫ***).

Accentological norms represent a special problem of speech impairment. It is no secret that stress in Russian is free, for this reason, mistakes associated with stressing words are quite common.

A very productive way to consolidate the skills of correct pronunciation is the use of specialized dictionaries ("Orthoepic Dictionary", "Russian Literary Pronunciation and Stress", "Dictionary of the Difficulties of the Russian Language"). The words in which accentological errors are often made **("*КРАСИ́ВЕЕ", "ПОЗВОНИ́Т", "СРЕ́ДСТВА*" "СВЁКЛА", "ВОДОПРОВО́Д", "ЖАЛЮЗИ́", "ФИЛИ́СТЕР", "НАЧАЛСЯ́", "БА́РМЕН",** etc.), must be included in the material of exercises and assignments, create speech situations using these lexemes.

In the lessons on the development of speech, the development of the culture of pronunciation is carried out through the analysis of the text, in the process of conversation, in the analysis of the performed exercises of a creative nature (essays, compositions). At the same time, the main method of teaching is imitation of models and analysis of the noticed shortcomings in the speech of students.

The upbringing of a pronunciation culture is associated with teaching expressive reading. Expressive reading is reading aloud in compliance with the orthoepic and rhythmomelodic norms of speech (intonation, lowering or raising the voice, setting logical stress, speech pauses, etc.). Teaching expressive reading is included in the content of the lessons of the Russian language and literature, since the study of any of the topics of these subjects contains rich opportunities for this. For instance, the study of the topic of homogeneous members of a sentence is associated with the intonation of the enumeration, and it is necessary to ensure that when reading the exercises performed, the presence of homogeneous members in the sentence is emphasized by means of the intonation of the enumeration. When studying separate members of a sentence, students can be offered to pick up sentences with isolated members and read them so

that listeners can determine which of the members of the sentence is isolated and the reason of it. The students select such sentences and practice expressive reading.

The content of the lesson can also be a competitive performance of previously prepared poems or prose excerpts. Along with the prepared texts, unfamiliar texts can also be offered in order to test the speed of students' orientation in the content of the passage, in finding the expressive means of the language.

A particular attention should be paid to the purity of speech. Purity of speech is the absence of unnecessary words in it, the so-called parasitic words. Unfortunately, the speech of the overwhelming majority of schoolchildren is replete with such similar examples: ***"ЭТА", "КАК БЫ", "ТИПА", "ВОТ", "В ОБЩЕМ", "ЗНАЧИТ"***, etc. Such a speech makes a very unpleasant impression on the listener, since parasite words do not carry a semantic load and do not have information content, they simply clog up speech and distract attention from the content of the statement. Besides, these words can distort the meaning of what is said.

Another problem of modern speech is that schoolchildren actively use slang words. Slang is not only an indicator of belonging to a particular group, but also a certain hallmark of an individual. Slang words and expressions used in speech make it possible to pass the identification of "own or strange", to show the hierarchical place of the student among peers, to increase the degree of steepness, to convey their attitude to the subject of discussion more vividly and succinctly, to be on the same wavelength with the latest language changes. The speech of many young people is literally "full" with similar words and expressions: ***"ПИПЕЦ", "КЛЕВЫЙ", "ЖЕСТЬ", "КЛАССНЫЙ", "СУПЕР", "КАЙФ", "ЛОХ", "АТАС", "ШУХЕР", "ПАЛЕВО"*** and so on. Here, the borrowings that have undergone a certain pronunciation and derivational transformation can be included such as: ***"ФЕЙК", "ЛАЙК/ЛАЙКАТЬ", "ХАЙП/ХАЙПАНУТЬ", "БАН/БАНИТЬ/ЗАБАНИТЬ", "НА ЧИЛЕ/ЧИЛИТЬ", "РЕСПЕКТ", "МЕССЕДЖ", "ЛУК", "ДРАЙВ/ДРАЙВОВЫЙ", "ЭКШЕН"*** and others. Truncated words also violate the purity of speech such as: "***ЗДРАСЬТЕ", "ДНЮХА/ДР"***(birthday), ***"УНИВЕР", "КАРОЧ", "КУРСАЧ"*** (course paper), ***"ПЕД"*** (pedagogical institute / university), ***"МЕД"*** (medical institute), ***"СТЁПКА/СТЕПУХА"***(scholarship) ,***"ППТ"*** (Power Point Presentation). Such lexical units at this time are already the norm in the speech of young people.

The use of abusive words and expressions by schoolchildren is of particular concern. In ancient times, people believed that demons penetrate into a house where people scold, and good spirits and angels leave such a dwelling. In ancient Russian literature and in the folk tradition, the prohibition on swearing was associated with the idea that obscenities offend "Mother Earth" and a person's own mother. Now, mate among young people acts as an indicator of a certain adulthood of a child, a kind of marker of freedom and the degree of emancipation. There is an opinion that mate allows you to establish a certain contact in a group, unites children. It is no secret that when studying a foreign language, memorization of abusive and obscene words by schoolchildren occurs faster than the study of literary words. The teacher's task is to explain to students that such words, neither in their native Russian nor in the foreign languages studied, are not a measure of maturity, that these are offensive expressions that humiliate the speaker himself, to tell in general terms about the origin of swear words and the reasons their vitality in the language.

Thus, the problem of reducing the speech culture of the Russian language should be solved from an early age, from an early school age, children should be introduced to the use of normative vocabulary. Correcting the speech of young people, instilling respect and love for the language is a task that should be solved systematically and everywhere, both at school and at home.

Young people should be able to speak competently and clearly, logically expressing their thoughts in oral and written form, should know the signs of good speech, be able to realize and feel these signs in literary texts. In the mind of the student, concepts such as the speech culture and a cultured person should be correlated. All this, in turn, will lead to an increase in the general culture, to the development and multiplication of spirituality, as the language is the soul of the people.

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PHLOMOIDES CANESCENS COMPLEX OF CARBOHYDRATES DISTRIBUTED IN THE FERGHANA VALLEY

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ABSTRACT

The carbohydrate composition of Phlomoides canescens grown in Uzbekistan has been studied. The carbohydrate complex was isolated, the monosaccharide composition was established, and the IR spectra were studied (WSPS-C, WSPS-H, PS, HMS-A, HMS-B). The presence of water-soluble polysaccharides was established and it was shown that they are heterogeneous polysaccharides of the arabinogalactan type.

KEYWORDS: *Water-Soluble Polysaccharides, Pectin Substances, Hemicellulose, IR Spectroscopy, Neutral Sugars, Uronic Acids.*

INTRODUCTION

Currently, the world pays great attention to determining the species composition of medicinal plants, studying their biological properties, assessing their cenopopulations, identifying natural resources, scientifically substantiating population changes as a result of external influences and analyzing the causes of decline, as well as improving conservation and reproduction. In recent years, the growing demand for natural medicinal herbs has led to a reduction in plant stocks.Based on the foregoing, in order to identify and assess carbohydrates of the *Phlomoides canescens* species common in the Shohimardon region of the Fergana region, in april-may 2021, field studies were carried out in the villages of Iordon of the Shohimardon region. Distributed areas of the plant were identified and samples were taken from the vegetative and generative parts of the plant to study its composition (1-Figure). To isolate and evaluate the complex of carbohydrates from plant samples, the goal was to isolate them using IR spectra: WSPS-C,WSPS-H, PS, HMS-A, HMS-B methods.

Modern concise classification of plants.

Phlomoides canescens belongs to the genus *Phlomoides* Moench of the Lamiaceae family. Central Asia, the mountainous regions of Iran (Iran and Afghanistan) and the Mediterranean are

the main centers of species diversity. In the flora of the Earth there are 150–170 species of this genus, in the flora of Central Asia there are 59 species, including 43 species in the flora of Uzbekistan [1,2].

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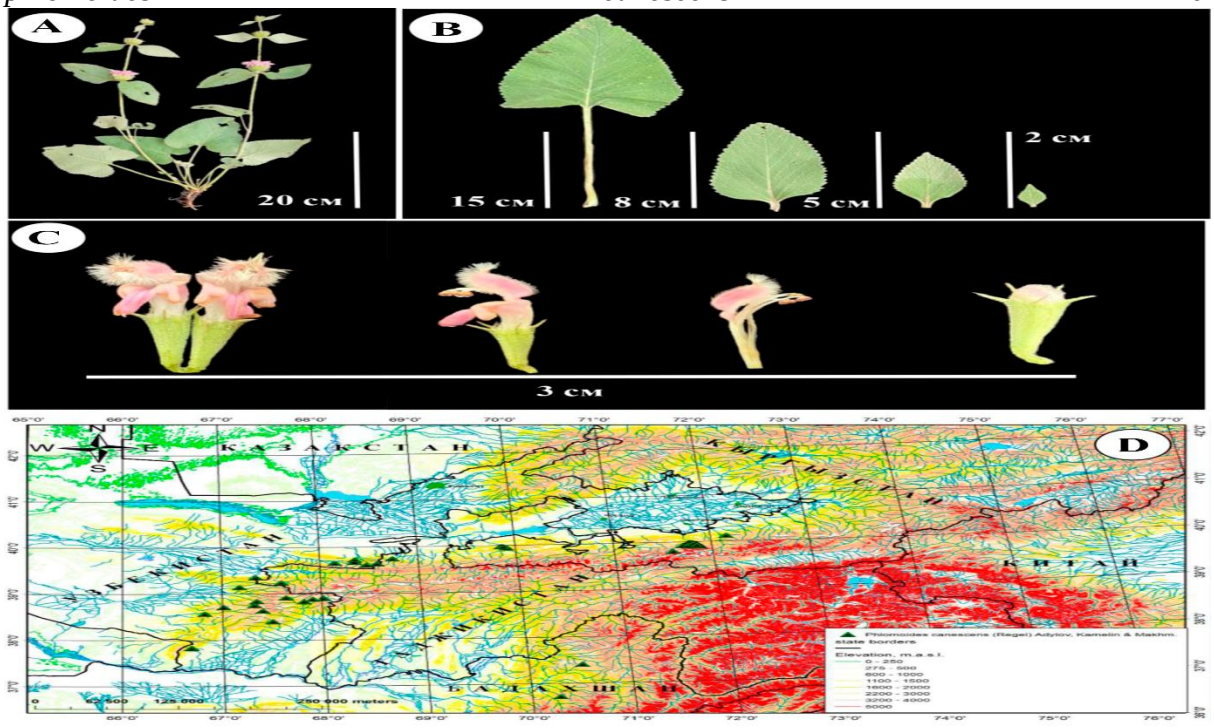
Type. TAJIKISTAN: Iskander - Kul, 16.06. [1870] O. Fedchenko (LE, lectotype, designated Rechinger 1982: 315) [5].

Life form and phenology. Hemicryptophytes, polycarpic Blossoms in june - july, bears fruit in july - august. [3].

Habitat. *Juniper* thickets, alpine subalpine meadows, thorny associations, middle and upper mountain belts, 1.600-2.800 m above [5].

Note. This species is close to *phlomoides oreophila*, characterized by leaves with stellate hairs at the top. The density and character of stellate hairs varies within the range of this species, therefore specimens with a low number of stellate hairs on the upper surface of the leaf cannot be distinguished as a separate species of *phlomoides tytthaster*. Intermediates to *phlomoides oreophila* are found both at the edge and within the distribution area. They can be obtained as a result of continuous hybridization in areas of contact with *phlomoides oreophila* and the very recent invasion of more eastern and northern species of *phlomoides oreophila*into the *phlomoides canescens* range



1-Figure. A- Phlomoides canescens species, B, C- Leaves and phenological organs structure,
D- GIS distribution map.

The purpose of this work is to study the carbohydrate complex of *Phlomoides canescens*, to establish their monosaccharide composition.

Research methods. Field studies conducted as part of the tour were carried out in april-may 2021 in Shohimardon district of Fergana region (Uzbekistan). The total area of the tour was determined on the basis of international electronic databases Plants of the World Online (www.plantsoftheworldonline.org), Global Biodiversity Information Facility (www.gbif.org). The addresses given in the samples of existing herbarium holdings (LE, TASH, FRU, TAD, MW) were derived from the geographic coordinates of Google Earth, and a GIS map showing the general distribution of the species was prepared using ArcGIS 10.0.

Experimental part.

Inactivation of raw materials. 100 g of dried and crushed raw materials (usimlik nomi) were twice treated with boiling chloroform for 2 hours at a hydromodule of 1: 4 to remove dyes and low molecular weight substances. Then, alcohol-soluble sugars were extracted twice with boiling 82 ° ethanol (1: 4, 1: 3). The alcoholic extracts were separated by filtration, combined and evaporated to a small volume, and analyzed by paper chromatography (PS) in a 6: 4: 3 butanol-n-pyridine-water system. To identify spots, acidic aniline phthalate (1) was used to identify hexose and a 5% alcohol solution of urea (2).

Isolation of WRPS-H. The remainder of the raw material was extracted twice with cold water at room temperature for 1.5 h at a hydromodule of 1: 4, respectively. The extracts were separated by filtration, evaporated to a small volume, and precipitated with a threefold volume of ethyl alcohol. The precipitate that formed was centrifuged (5000 rpm, 10 min), washed, and dehydrated with alcohol. Output WSPS - 1 g.

Then the remainder of the raw material was twice extracted with water at a temperature of 80-85° for 1.5 hours at a hydromodule of 1: 3, 1: 2. The extracts were combined, evaporated and precipitated with alcohol. The formed precipitate was treated as described above. Output WSPS-g 1.2 g.

Isolation of pectin substances (PS). After the isolation of the total WSPS, the meal was twice extracted with an equal mixture of 0.5% solutions of oxalic acid and ammonium oxalate at a temperature of 75° C; the extraction was carried out at a hydromodule of 1: 4, 1: 3. The extract was separated by filtration, dialyzed against running water, evaporated, and precipitated with a threefold volume of alcohol. The precipitate was processed in the same way as described above. Output PS 6.2 g (from air-dry raw materials).

Isolation of HMS-A and HMS-B. After isolation, PS was treated twice with 5% KOH solution at room temperature, for 1.5-2 hours, with a hydromodule of 1: 3. The extracts were separated by filtration, neutralized with CH_3COOH, centrifuged to obtain a HMS-A precipitate with a yield of 1.0 g, the lagging solution was evaporated until thick and precipitated with a three-fold volume of alcohol. The precipitated HMS-B precipitate was separated by centrifugation, washed and dried with alcohol, yield 4.4 g.

Complete acid hydrolysis of polysaccharides. Samples of WSPS were hydrolyzed with 1N H_2SO_4 at 100°C, 8 hours, PS,HMS-A and HMS-B 2n H_2 SO_4, 100 ° C, 48 hours. The hydrolysates were neutralized with barium carbonate, deionized with KU-2 (H^+) cation exchanger, and evaporated. The high-quality monosaccharide composition of PS was studied by BH using known witnesses on Filtrak FN-12 paper, in the system of butanol-pyridine water 6: 4: 3, developer 1.2. GC analysis of the samples was carried out on a Shimadzu GC-2010 chromatograph with a flame ionization detector, a Shimadzu Rxi-624Sil MS quartz capillary column 30mx0.25mmx1.40μm), the mobile phase rate (N_2) 1.5 ml / min, injector temperature 260 ° C, detector temperature 280 ° C and column temperature 230 ° C. The samples were taken in the form of aldononitrile acetates [2]. The IR spectra of the samples were recorded on an IR Fourier spectrometer, System 2000 (Perkin-Elmer) in KBr pellets. Number of scans 100.

RESULTS AND THEIR DISCUSSION

We sequentially isolated various polysaccharides from (nomi plants): alcohol-soluble sugars (ASS), water-soluble polysaccharides (WSPS), pectin substances (PS), hemicelluloses (HMS). SRS according to HR data (system 1, developer 1.2) are represented by glucose and fructose. Water-soluble polysaccharides (WSPS) were isolated in two ways: extraction of raw materials with cold water (WSPS-x), i.e. at room temperature and hot water at a temperature of 80-90 ° C (WSPS-g). Pectin substances (PS) were isolated with a mixture of 0.5% solutions of oxalic acid and ammonium oxalate, hemicellulose (HMS) - with a 5% KOH solution. The yield of polysaccharides and their monosaccharide composition are shown in Table 1.

TABLE 1. CONTENT OF VARIOUS GROUPS OF PHLOMOIDES CANESCENS POLYSACCHARIDES AND THEIR MONOSACCHARIDE COMPOSITION

Carbohydrate type	Output, %	Ratio of monosaccharide residues, GC						
		Rha	Ara	Xyl	Man	Glu	Gal	UAc,%
WSPS-x	1.0	3.0	25	7.0	4,3	10	30	25
WSPS-g	1,2	3.0	27	5	3	12	25	27
PS	6.2	-	16	2	-	7	15	60
HMS-A	1.0	7	30	3	-	-	20	40
HMS-B	4.4	2	25	10	-	-	18	45

As can be seen from Table 1, among the polysaccharides, PS are dominant (6.2%), with the HMS content being 5.4%, and the WSPS content in smaller amounts - 2.2%. WSPS are light beige amorphous powders, readily soluble in water. Monosaccharide compositions of WSPS did not differ sharply qualitatively, but the difference was in the quantitative ratio. The main monosaccharides of WSPS-x are Gal, Ara and Glu, and in WSPS-r- Ara, Gal; other monosaccharides are present in smaller amounts. Aqueous solutions of WSPS give a negative reaction to starch. The ratio of monosaccharides suggests that heterogeneous polysaccharides with a predominant content of glucans constitute the basis of WSPS-x, while both glucans and galactoarabinans may be present in WSPS-g.

In the IR spectra of WSPS-x and WSPS-g, the main absorption bands were found: 3339-3418cm^{-1}(OH-groups), 1599-1613 cm^{-1} (HOH), 1415-1418 (C = O), 1074-916, 1018-911cm^{-1}(α-glycosidic bond). Pectin substances are an amorphous cream-colored powder that partially dissolves in water to form a viscous solution.

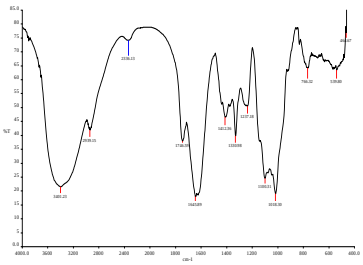
In the IR spectra of PS (Fig. 2), absorption bands were found: 3434cm^{-1} (OH-groups), 1748cm-1 (C = O free and COO- esterified carboxyl groups), 1434cm^{-1} (vibrations of ionized carboxyl), 1365cm^{-1} (-OCH_3), 827cm^{-1} (α-glycosidic bond) [3,4].

The monosaccharide composition is represented by neutral and acidic monosaccharides. The largest amounts are found for arabinose and uronic acids, the content of the latter according to the carbazole method is 72% [5]. According to the IR spectrum, PS is an esterified polysaccharide. To determine the degree of esterification, titrimetric analysis was carried out, the results of which revealed the content of carboxyl and esterified groups: Kc (free carboxyl groups) - 8.1%, Ke (esterified carboxyl groups) - 9.0%. The data obtained correspond to the degree of esterification - 52.6%, which makes it possible to classify the studied PS as highly esterified pectins [6].

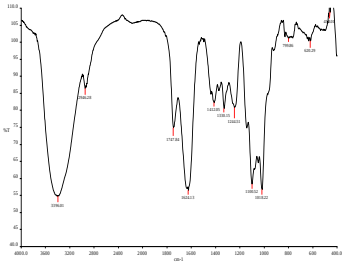
HMS-amorphous powder of light cream color, partially soluble in water, completely in dilute alkali solutions.

In the IR spectra of HMS, absorption bands were found: 3640 cm-1 (OH-groups), 1742 cm^{-1} (C = O), 1078 cm^{-1} (pyranose ring), 1588 cm^{-1} (COO^-), 850 cm^{-1}(α -glycosidic bond) (Fig. 2).

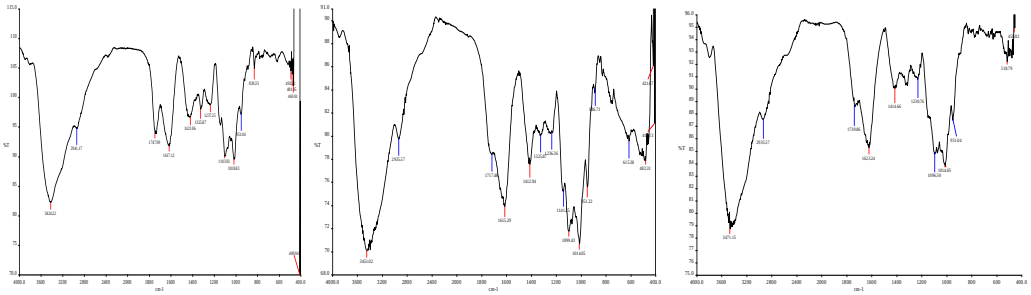
Based on the results obtained, it can be seen that the WSPS of *Phlomoides canescens* consist mainly of the following polysaccharides: arabinogalactans.



2-Figure. IR spectra - WSPS –x



3-Figure. IR spectra - WSPS –g



4-Figure. IR spectra - P5-Figure. IR spectra - HMS-A6-Figure. IR spectra - HMS-B

CONCLUSION

Alcohol-soluble sugars, water-soluble polysaccharides, highly esterified pectin substances and hemicelluloses were isolated from Phlomoides canescens. Their qualitative and quantitative characteristics are given. The isolated polysaccharides were analyzed by IR spectroscopy.

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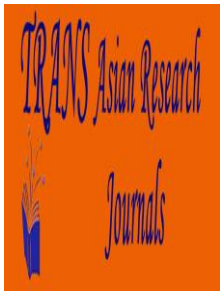

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A STUDY OF FOG COMPUTING TECHNOLOGY SERVING INTERNET OF THINGS (IOT)

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ABSTRACT

The Internet of Things (IoT) is producing a massive amount and diversity of data that has never been seen before. However, by the time the data reaches the cloud for processing, the chance to act on it may have passed. This white paper describes a new paradigm for evaluating and acting on IoT data for IT and operational technology experts. Edge computing or fog computing are two terms for the same thing. Instead of transmitting huge quantities of IoT data to the cloud, analyzes the most time-sensitive data at the network edge, near to where it is produced; acts on IoT data in milliseconds, depending on rules; Sends chosen data to the cloud for longer-term storage and historical analysis. In certain IoT applications, it's critical to speed up data processing in order to obtain real-time results. CISCO developed fog computing, a next-generation networking technology, to achieve this goal. It's similar to the cloud, but smaller, and it serves the network's edge from a closer geographical location. It has the potential to increase the yields of ubiquitous smart networks and is a step toward a smarter world. The goal of this article is to explain the fundamental idea of fog computing technology and compare it to other comparable technologies. The difficulties of this technology are addressed, as well as current work done to solve them.

KEYWORDS: *Cloud Computing, Fog Computing, Internet Of Things, Mist Computing.*

1. INTRODUCTION

The Internet is the age of the twenty-first century. It provides very valuable data to industries such as health care, education, business, and electricity. This information gold mine is uncovered by analyzing massive quantities of data generated in these industries. In recent years, the use of ubiquitous networks of smart objects to get information and control over the environment has grown in popularity. The Internet of Things (IoT) is a network that links smart things (other than

computers or laptops) by using a standardized protocol framework to create communication among them, regardless of their physical locations[1]. Every day, these networks (which include wearables, routers, security cameras, aircraft data recorders, and other sensors) generate enormous quantities of data.

These data are transmitted to the cloud, where they are analyzed for improved decision-making. The collected insights are utilized to control the actuators in question. Fog computing technique performs processing tasks with temporary data storage at the network's edge. Figure 1 depicts a broad perspective of a fog computing architecture. It facilitates the storing, processing, transmission, and administration of prioritized data generated by sensors[2]. It makes use of decentralized processing, which basically eliminates the cost of responding to actuators late. It provides real-time reaction to apps and information derived from data to the cloud.

The cloud does further processing on the fog's processed and filtered material and returns wisdom to the fog for improved discernment. It takes use of cloud and edge resources and improves coordination between them in order to achieve low latency, high throughput, and scalability[3].Real-time reaction based on data provided by monitoring equipment is prized in industries such as health care. Hazardous situations may be identified or anticipated and dealt with quickly utilizing a fog computing technique. Its fields of application include smart car management, smart traffic control, real-time gaming, and augmented reality, all of which need low latency computing. In latency-sensitive sectors, it outperforms the cloud by[4],

- Reducing the amount of time, it takes to transmit large amounts of data produced by IoT devices across vast distances,
- Decreasing data's vulnerability to cyber-attacks and
- Decreasing the distance traveled by the actuation command.

1.1.Fog In Comparison To Other Similar Technologies

Through next-generation networking technologies, there are new paradigms that provide services remotely display dispersed resources. This section compares and contrasts a few of these paradigms, as well as establishing the role of fog in the image. Cloud computing refers to a vast collection of resources that provide platform (PaaS), infrastructure (IaaS), and software (SaaS) as a service on a pay-per-use basis. It uses distant data centers and clustered server computers to store and analyzes data, which takes a long time to generate insights. It is incompatible with certain systems that need a quicker reaction time[5].

A cloud service for mobile devices is known as mobile cloud computing (MCC). Mobile devices may outsource their processing tasks to cloud servers, saving energy, processing, and storage resources[6]. The Mobile cloudlet is created by a cluster of devices. A device that is rich in a particular resource type may serve the network with that resource type, whereas another device can serve the network with other resource kinds, and so on. It reduces unloading time and provides high-quality service to mobile device users. The calculations are carried out using mist computing technology inside the sensors and actuators. It transmits data to the server only when the server requests it. By decreasing data transmission, it saves energy and bandwidth.

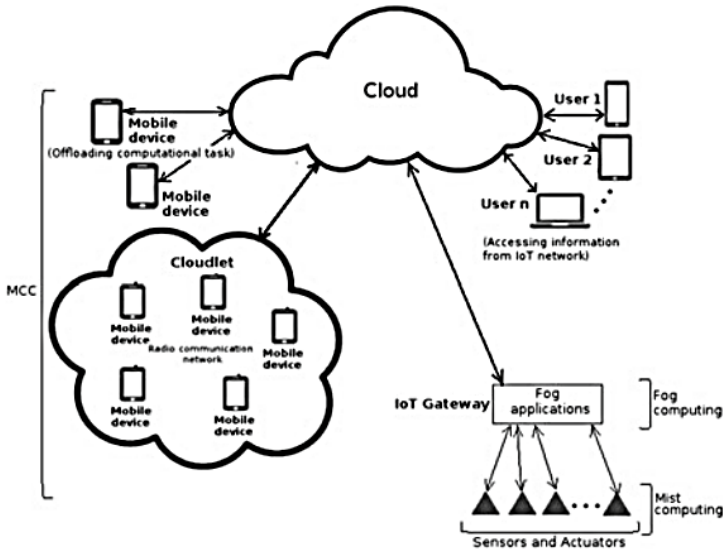

Figure 1: Depiction of Cloud, MCC, Cloudlet, Fog and Mist Architecture

Fog is a still-maturing new technique for processing IoT data with the goal of meeting the needs of the growing number of smart mobile devices. It is being improved and advanced by a number of researchers and corporations. A review of the difficulties is given, as well as some current research efforts that address them.

1.2.Real-Time Resource Management

It is necessary to manage resources efficiently in order to achieve lowest latency and maximum throughput while using the least amount of energy and bandwidth. The job is carried out by the edge devices and the server in the real-time fall detection algorithm based on accelerometer data. This provides Stack4Things, a framework for Smart City Cyber Physical Systems solutions that spans the IaaS and PaaS levels. This method makes use of existing fog and cloud resources to provide large-scale offloading applications with a resource management and job scheduling strategy[7]. This work dynamically pushes programs to devices for data pre-processing. End devices, edge networks, and data centers are used to create a congestion-free, speedier network. The MMOG offers a cloud-fog architecture for rendering game videos and processing other user requests on devices other than the users' own.

1.3.Problems With Performance

It's difficult to get excellent performance out of IoT networks with limited resources, such as fast data aggregation, quick resource provisioning, and node mobility. In an e-Health solution called Fog CAMA is deployed, and the results are compared to Cloud CAMA. A dynamic video stream processing method for urban traffic surveillance near the recording equipment was suggested in the article. (drone camera). The overloaded cloudlets in the architecture transfer work to fog servers placed on buses to provide a higher QoE to mobile users[8]. This article uses fog to identify and resolve people based on their biometric ID, which is a smart provisioning of limited resources. It offers a load balancing method for a cloud-fog-based architecture that emphasizes consistent load distribution over a larger number of edge nodes and closer proximity. It uses a smart watch to gather clinical speech data, conducts processing and storage work between the sensor and the cloud, and then transmits the processed data to cloud storage. It presented a fog-

based smart-grid architecture and described its advantages, such as reduced latency, increased security, and dependability[2].

For these bandwidth-constrained networks, network management is also a problem. Modern technologies, such as software-defined networking (SDN), may help to improve network control. This method compares and implements multiuser clustering of radio access points in both controlled and decentralized levels[7]. It provides a bandwidth prediction model, a fog infrastructure load balancing method, and a dynamic edge node selection mechanism for improved QoS. Fog radio access networks (F-RAN) are presented in this study to alleviate the high load of large-scale radio signal processing in the centralized baseband unit pool.

The implementation of security and privacy in fog networks, which include resource limited, diverse, and dispersed nodes linked via numerous service providers, is a difficult job. Multicast authentication using public key infrastructure (PKI)-based technologies is a potentially viable approach. Tolerance for Mistakes Another essential factor to consider is fault tolerance. It's also a problem since the system must be built in such a manner that it can withstand the failure of some of its components. The fault-tolerant and real-time system is provided by the time-triggered distributed architecture. It moves a software component from faulty hardware to functioning hardware in an instant. Other critical concerns include scalability, platform dependency, and interoperability[7].

The following are some of the benefits of fog computing:

- Reduce the amount of time it takes for something to happen. Keep analysis near to the data source to avoid cascade system failures, manufacturing line shutdowns, and other significant issues, particularly in verticals where every second matters. The capacity to perform real-time data analysis implies quicker warnings, less risk for consumers, and less wasted time.
- Make the most of your network bandwidth. Many data analytics activities, including important studies, may not need the scalability provided by cloud-based storage and processing. Meanwhile, linked gadgets produce an increasing amount of data that may be analyzed. Fog computing removes the need for much of this enormous data to be sent, freeing up bandwidth for other mission-critical activities.
- Lower your operational expenses. Lower operational expenses are achieved by processing as much data locally as feasible and saving network bandwidth.
- Increase the level of security. It is critical to safeguard IoT data while it is being sent or stored. To offer improved cybersecurity, users may monitor and defend fog nodes using the same controls, rules, and procedures implemented throughout the whole IT system and attack continuum.
- Boost your trustworthiness. Because IoT devices are often deployed in hostile environments and during crises, circumstances may be severe. Under these circumstances, fog computing may enhance dependability while lowering the data transmission load.
- Deepen your understanding without jeopardizing your privacy. Instead of transferring sensitive data to the cloud for analysis and risking a data breach, your team may analyze it locally on the devices that gather, analyze, and store that data. As a result, the nature of fog computing's data security and privacy provides better choices for more sensitive data.

- Boost your company's flexibility. Businesses can only react to client demand swiftly if they know what resources they need, where they need them, and when they need them. Developers can create fog apps quickly and deploy them as required thanks to fog computing. Fog computing technology also enables users to provide more tailored services and solutions to their clients, as well as place data and data tools where they can be processed most effectively, all while using current computer capabilities and infrastructure.
- One of the most difficult aspects of fog computing is the significant dependence on data transmission. The introduction of the 5G network has helped to alleviate this problem, although there are still problems such as restricted availability, slower speeds, and peak congestion. Other possible problems that need to be addressed at fog nodes are speed and security.

1.4.Platform And Applications For Fog Computing

- Fog computing may be used to create a smart electricity grid. Smart cities must be able to react to increasing and decreasing demand, lowering output as necessary to remain cost-effective. Smart grids, therefore, require real-time electricity consumption and production data. These smart utility systems often collect data from a large number of sensors and must withstand distant installations. Fog computing architecture is an excellent option in any case.
- Another use of fog computing is smart transportation networks. On this type of grid, every connected car, traffic gadget, and even street produces a stream of data. Obviously, a massive quantity of real-time data processing is required to prevent accidents, and a fog computing method is required to share the limited mobile bandwidth available.
- Fog computing and IoT in general is a burgeoning field. Fog computing may also be used in connected industrial equipment with cameras and sensors, as well as systems that utilize real-time analytics.

1.5.Fog Computing's Operation

Fog computing is implemented by developing or porting IoT applications for fog nodes utilizing fog computing software, a package fog computing program, or other tools at the network edge. Edge nodes, or nodes closest to the edge, collect data from other edge devices such as routers or modems and route it to the best place for analysis[9].Administrators will determine which data is the most time-sensitive when integrating fog and cloud computing networks. Within validated control loops, the most important time-sensitive data should be evaluated as near to where it is produced as feasible.The system will then send data to an aggregate node that may be examined later. The features of fog computing essentially state that based on the eventual objectives of the analysis, the kind of data, and the user's immediate requirements, each type of data decides which fog node is the best place for analysis[10].

2. DISCUSSION

Fog computing can be used to describe a cloud computing alternative. By putting some resources and transactions at the network's edge, this strategy capitalizes on the twin issue of the proliferation of computer devices and the opportunity provided by the data such devices produce. Rather of creating in-cloud channels for usage and storage, users aggregate bandwidth at access points such as routers by placing them closer to devices. As a result, less data may be sent away from data centers, over cloud channels, and over long distances, lowering total bandwidth

requirements. Another significant distinction between cloud computing and fog computing is data storage. Because less data requires immediate cloud storage in fog computing, users may instead subject data to strategic compilation and distribution procedures that increase efficiency and save costs.

It is simpler to leverage on the current processing capacity in devices by shifting real-time analytics into a cloud computing fog situated closer to them. This enhances the user experience while also lowering the cloud's overall load. Devices linked to the internet of things benefit from fog computing the most (IoT). Fog computing and cloud computing vary mostly in terms of decentralization and flexibility. Fog computing, also known as fog networking or fogging, is a decentralized computer architecture that sits between the cloud and data-generating devices. This adaptable framework allows users to optimize performance by placing resources, such as programs and the data they generate, in logical places.

The structure's aim is to provide fundamental analytic services closer to where they're required, at the network's edge. This lowers the distance over which users must send data over the network, resulting in improved performance and overall network efficiency. Users gain from fog computing security concerns as well. The fog computing paradigm can divide bandwidth traffic, allowing users to increase network security by adding extra firewalls. Fog computing retains some of the characteristics of cloud computing, from which it evolved. While utilizing a fog computing paradigm, users may still store apps and data elsewhere and pay for not just offshore storage, but also cloud updates and maintenance for their data. Their teams will still have remote access to data.

3. CONCLUSION

The benefits and implications of fog computing technology in developing network topologies are the subject of this research. It also compares fog computing to other comparable technologies in order to determine its significance and effectiveness in the area. Fog computing, it can be argued, is a new technology that effectively solves the latency sensitivity problem in IoT networks. It's a new technique; therefore there are a few unanswered questions that need to be addressed by academics and developers. The cloud enables consumers too quickly and easily access computer, networking, and storage options, but it is a centralized resource. Data and devices situated distant from the centralized cloud may experience performance problems and delays as a result.

Another way to look at the distinction between edges computing and fog computing is to see fog as the standard that allows for repeatable, structured, and scalable performance inside the edge computing framework. Data is produced, processed, and stored close together in edge computing, which a kind of fog is computing. Edge processing, as well as the required infrastructure and network connections for data transmission, are all part of fog computing. This is due to the fact that both fog and mobile edge computing seek to decrease latency and increase efficiency, yet they process data in somewhat different places. Edge computing occurs when sensors are connected to equipment and data is collected—there is a physical connection between the data source and the processing site. Fog computing reduces the distance between the processing site and the data source by performing edge computing operations inside an IoT gateway or fog node with LAN-connected processors or within the LAN hardware. As a consequence, the processor and sensors are physically separated, yet there is no extra delay.

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TRADITIONAL IMPLEMENTING USAGE OF CORE PROGRAMMING LANGUAGES IN THE OBJECT ORIENTED PROGRAMMING

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ABSTRACT

In today's technology era, programming is more essential than ever. Python and C++ are the most widely used programming languages. Python, the most popular programming language of the twenty-first century, is a higher-level object-oriented language, while C++ (the language that powers most operating systems) is a lower-level object-oriented language. Python and C++ are compared in this article. This book covers an introduction to various languages, memory management techniques, and reasons for their program execution speed. Furthermore, this study looked at the execution time and memory requirements of a variety of algorithms in both languages, comparing the best, average, and worst situations in each language. Furthermore, they are compared in terms of their benefits and drawbacks. C++ is faster than Python in terms of execution speed, according to the findings, but Python is a better option for beginners due to its simplicity. Aside from that, the language should be selected depending on the project type in order to get the best results. Programmers play a crucial role in computing. C/C++, Python, and Java are the most common languages. Beginning programming classes often utilize C++ and Java. Python has grown in popularity as an introductory programming language due to a variety of reasons. As an entry-level programming language, C, C++, Java, and Python were compared. More students selected Python over C++ because of its better pseudo-code syntax, simpler learning environment, and greater abstraction.

KEYWORDS: *C, C++, Java, Memory, Programming Languages, Python.*

1. INTRODUCTION

The majority of programmers and computer scientists are well-versed on the benefits and drawbacks of different programming languages. We aim to provide objective information by

comparing C, C++, Java, and Python. The same software was used to meet the requirements of each language. Because the comparison is limited yet homogeneous as a consequence, each programming language is also subjected to a study of many alternative implementations by different programmers. It has two benefits. By utilizing a single implementation per language, programmers' difficulties may be reduced. The variety of program features produced by various languages may also be analyzed and compared in this research.

Each language is compared on many levels, including program length and effort, as well as runtime and memory efficiency[1]. Languages are also examined individually and in groups. CSS and other scripting languages, at least during the software development phase, have a propensity to be interpreted rather than compiled, and therefore do not need variable declarations. Typed variable declarations are needed in traditional programming languages such as C, C++, Java, and Python since they are compiled rather than interpreted. Because Java is inefficient, C, C++, Java, and Python are often lumped together.

In the past, standard methods were not utilized to compare the performance of various programming languages. Programs for the Sellers algorithm, the Neighbor-Joining tree construction technique, and a parsing algorithm for file outputs were written in C, C++, Java, and Python. The implementations written in C/C++ were the fastest and used the least amount of memory. These languages' programs tend to contain more lines of code. Java and C# were formerly thought to be a compromise between the versatility of C, C++, Java, and Python and the performance of C/ C++. There was no significant difference in relative performance of tested languages in testing comparing Windows and Linux[2].

1.1.Statistical Methods and Plots

The multiple boxplot presentation was used as the primary evaluation tool in this research. A subset of data appears to the left of each line, with its name at the start. Each small circle represents a unique data value. The graphic may be used to compare two or more such data subsets visually. This data covers the 25 percent to 75 percent quartiles in the middle portion of the data, as shown by the shaded box[3]. The "whiskers" on the right and left indicate the data's lowest and highest 10 percent. The fat dot inside the box represents the median (50 percent) quartile within the box. The arithmetic mean and standard error of the mean are denoted by M and the dashed line around it (plus and minus one).

It's used to quantitatively characterize the variability within a set of numbers in the bad-to-good ratio: Assume the data is split into two halves, with the bad-to-good ratio equal to the median of each halves' median divided by the median of each halves' median. The median in a boxplot is the difference between the values at the box's right and left borders. In comparison to a measure of variability like the standard deviation, the bad-to-good ratio is more resistant to outliers.

The plots are an excellent method to highlight the most essential points. It did, however, do statistical studies just to be sure. The medians are compared using the Mann-Whitney U test (also known as the Wilcoxon rank sum test). It's possible that the reported differences across samples are just coincidental, and that the underlying populations have no difference or vary in the other way. The p-value is the result of each test.

1.2.Validity Of The Comparison

It's only fair to compare programming languages using real-world examples if the programmers' skills are comparable. In our case, it is not essential for the programs to be comparable on an

individual basis. According to a recent research, several factors jeopardize the comparability of 80 programs in the study. The programs are available from two different sources.

The Java, C, and C++ apps were created by computer science master students during a controlled experiment performed in 1997 and 1998[4]. Many volunteers replied to a "request for programs" posted on different forums by writing code in C, C++, Java, and Python in a variety of situations. As a result, these subjects' origins and experiences are more varied. A public call for programs, for example, may only attract experienced programmers, thus scripted applications may have higher average programmers' skills than non-scripted equivalents[5]. According to two observations, this discrepancy is not a problem. Students that developed the non-script apps were also highly competent and accomplished in their respective areas of study in a few instances approved. Non-script programmers are less competent in their language than C and C++ programmers, owing to Java's relative infancy in 1997 and 1998. When it came to programming, the Perl topics may have performed better than the others since Perl programmers, in my opinion, are more competent than the others.

1.2.1. What Is The Difference Between C And C++?

The performance of C and C++ is quite comparable. You may not be surprised to learn that C++ is an extension of C. It came close to matching the results of building a C program using the C++ compiler. However, we noticed some minor deterioration while utilizing C++ standard libraries (such as character strings). Tokenization was two times quicker than regular expressions for the identical BLAST file, although it took longer to build the program using tokens.

1.2.2. C/C++ Vs. Java

C# seems to need less RAM than Java to store strings in memory while reading DNA sequences from a file[5]. In C#, this kind of file was likewise simpler to comprehend. In the global alignment trial, Java was somewhat quicker, but considerably slower in the NJ program, which is a bit unexpected. Regular expressions seem to be implemented better in Java than in C#. This difference was not caused by Cinability #'s to handle big files, since it reads them faster than Java. Java took 3.2 minutes to read the same file, whereas C# took just 2.8 minutes.

1.2.3. Linux Vs. Windows

The relative performance of the tested languages on Windows, on the other hand, did not differ, but the overall performance did[6]. Only C, C++, Java, and Python were consistently faster on Windows. As demonstrated in Figure 2, every implementation of the global alignment program performed better in the Windows environment. In both the NJ and BLAST parser instances, C and C++ were slower on Windows, while Java and Perl were faster in the NJ example but slower in the BLAST parser example. The comparison between Linux and Windows must be viewed with caution due to variations in compiler implementations and the operating system that executes them. Finally, since the user is looking for performance in the apps rather than the OS or compilers in general, speed and memory use are the most significant factors.

1.3.The Programming Issue

The program must find a string of words with characters that exactly match the numbers in the phone number. All possible answers should be found and printed. The program generates the answers word for word. If a dictionary term cannot be provided at any moment, a phone number digit may be substituted. The program must maintain a list of partial responses while processing

each number. For simple access, the dictionary should be stored in a supporting data structure, such as a binary digit tree.

However, data indicates that the script group's average work time is also quite accurate: In general, the number of lines written per hour is unaffected by the language[7]. It's even better that the same data shows that the script group's programmers don't have superior abilities. The non-script group, for example, was given instructions emphasizing correctness as the main goal, while acceptance testing required high reliability and at least some efficiency. It's also conceivable that the average programmer's ability to program in two distinct languages varies somewhat. Tiny differences across languages should be ignored for a variety of reasons, including the possibility that they are due to data deficiencies. Large disparities, on the other hand, are almost always justified.

1.4.Structural Language Implementations In Different Operating Systems

All of the programs in this article were written by a single programmer with different degrees of experience in Java, Perl, and C++. As a consequence of the learning process, additional languages have been implemented. Because the semantics of C, C++, Java, and Python are similar in certain ways, but their philosophies are different, and applications should be designed according to the language paradigm[8]. Perl programmers prefer arrays and hash tables over loops, which are more frequently used in C. Keep in mind that adding a new value to a hash function may be costly if the amount of memory allocated is more than an array with the same number of components. Because of the additional cost of adding the key-value pair, a hash table should be avoided when a programmer must examine all of the data in a hash table sequentially.

The array version of the Perl NJ technique was proven to be faster and more memory efficient than the hash table version. As a consequence, this test did not utilize a hash table. There is a trade-off to be made between performance and convenience. In Perl or Python, a single command may read and load a file into memory. The operating system may begin to transfer memory out, causing the machine to slow down[9]. When building things, it's essential to take precautions and reduce the number of items as much as possible. Immutable objects, such as the String object in Java, should be avoided wherever possible, particularly when temporary objects are created in frequently used methods, to prevent memory leaks or heavy applications. Because of their capacity to reflect, objects written in C, C++, Java, and Python take up more memory than those written in other object-oriented languages like C++.

Reflection is a powerful method for these languages that adds to their flexibility. Reflection method calls incur a substantial performance cost, making the code harder to understand, and errors are discovered at runtime rather than compile time, thus this feature should be utilized with caution. The speed of any language is affected by how objects are fetched and stored in memory. C, C++, Java, and Python store objects as blocks of data that can be retrieved by constant offsets, as opposed to Python's hash table-based object storage approach[10]. Object generation in Perl may be done in a number of ways. Despite the fact that arrays are faster, prevent attribute collisions, and need less memory than hash tables, most programmers prefer hashes. NJ's Perl implementation has been significantly improved by converting each sequence to an array rather than utilizing the subset function on the string of characters to calculate the Similarity Matrix, as was previously done. Despite a 10% increase in program performance, the program's memory footprint increased by tenfold.

1.5.The Programming Code's Expressiveness

The number of lines in a program is determined by the programmer's choice for brevity over readability. It's critical to emphasize that expressiveness and stage performance have nothing in common. However, a significant difference was seen, particularly when regular expressions were used. A Java programmer must first create a Pattern object, which contains regular expressions in compiled form, according to the Java documentation. The programmer must next create a Matcher class, which parses a Pattern object and performs match operations on character sequences.

This article does not cover all programming languages. The degree of programming and the intensity of typing are only two features of a programming language, and there are many interesting languages that can't be cleanly categorized as system programming or scripting languages. Scripting languages, in contrast to system programming languages, provide a distinct set of trade-offs. In comparison to system programming languages, they trade execution speed and typing strength in exchange for much higher programmer productivity and software reuse. This trade-off becomes more reasonable as computers become faster and cheaper than programmers. System programming languages thrive at managing data structures and algorithms, while scripting languages excel at gluing programs together, where the complexity lies in their connections. Scripting will become a more important programming paradigm as gluing tasks become more prevalent in the twenty-first century.

2. DISCUSSION

Those who learnt Python had no previous programming expertise, while students who studied C++ did. As a result, students who had never coded before started studying Python, while those who had previously studied C++ continued to do so. When comparing the following data, this is an important aspect to consider.

Students found Python's algorithm design and functions to be more difficult than C++, which is reasonable given that majority of the students were new to programming at the time they studied Python. It was difficult to think about problem resolution and create an overall strategy without any previous knowledge. User-defined modules (UDMs) were first introduced in Python. This may affect a student's capacity to study as well as their perspective of view. Another reason may be that during the first semester, students were creating small and rudimentary programs and didn't understand why functions were required. It's the same thing with lists. Lists are likewise taught early in the Python course, however after about half of the course has been covered in C++, lists are introduced. Furthermore, some of the students had previous programming expertise, and C++ was the only language available as an option in their previous education.

More constructs in C++ constructions result in a higher score. As a consequence, prior experience may have aided certain students. When it came to loops and conditional expressions, students appeared to enjoy Python's clarity and logic. This is in line with a previous research [16], which showed that students felt writing comments or documentation for small programs was useless, and they likely feel the same way about writing documentation. They didn't appear to like this job, maybe because they were young and used to generating comprehensive documentation and hadn't yet acquired the necessary skills. Because C++ did not include file management, there was no way to compare the two.

3. CONCLUSION

The programming language used for a beginning programming course is crucial. Our results suggest that the programming language a student chooses may have a major impact on their learning, survival, and growth in the area of computers. The main assumption of students in a beginner language is that it would be simple to learn. Despite the importance of other languages such as C, C++, Java, and Python, Python is a very powerful and practical option for a beginning programming education. Students prefer Python over C++ because they think most of the language's features, such as loops and conditionals, are easier to understand.

Students majoring in computer science must be able to program. Most teachers begin by teaching traditional programming languages like as C, C++, Java, and Python, which are effective for creating real-world applications and therefore popular in industry. The complex grammar of these languages, on the other hand, is a barrier to learning for novices. The most popular learning programming language, Python, is compared against Java in this poll. Python's simple syntax and high-level data structures make writing small applications a breeze. Students may use Python's numerous paradigms to learn various elements of programming languages. As a consequence, Python is gradually displacing other languages as the preferred language for learning.

In the end, the likelihood of either language being chosen was about equal in both instances. C++ is a well-known programming language with a strong reputation for ensuring a bright future for its users. Python, on the other hand, is attractive because of its multi-paradigm nature. Its growth hasn't slowed, and it continues to recruit programmers from the private sector. When it comes to choosing C++ as the best option for future projects, 52 percent of students in our study feel more confidence now that they've been taught C++. They are also enrolled to study object-oriented C++ in the next term after completing the C++ class. While 64% of students believe they will be able to continue to utilize Python as they progress, the remaining 32% are uncertain. Python is regarded not just as a method to educate beginners to programming, but also as a tool for the future, as shown by the enormous number. It's worth noting that the majority of C++ voters were experienced programmers, while the majority of Python voters were beginners.

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GENERAL DESCRIPTION OF THE ACTIVITY OF JSC "UZBEKNEFTEGAZ" AND IMPROVEMENT OF ITS STRUCTURE TAKEN INTO ACCOUNT

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ABSTRACT

The activities of the Uzbekneftegaz industry are aimed at maximizing the opportunities for a significant increase in hydrocarbon production, supplying them to the domestic market, deepening the technological processes of oil and gas processing for the production of products with high added value, the production of import-substituting products and access to the export oil and gas markets, creating favorable conditions to attract foreign direct investment in the oil and gas industry.

KEYWORDS: *UzbekneftegazIndustry, Hydrocarbon Production, Domestic Market, Oil, Gas, Foreign Direct Investment.*

INTRODUCTION

The improvement of the management structure of the oil and gas industry is always based on:

- Decree of the President of the Republic of Uzbekistan dated 11.12.1998 No. UP-2154 "On the transformation of the national corporation of the oil and gas industry "Uzbekneftegaz "into the national holding company "Uzbekneftegaz "",
- Resolutions of the Cabinet of Ministers of the Republic of Uzbekistan dated December 15, 1998 No. 523 "On questions about the organization and activities of the national holding company "Uzbekneftegaz",

- Resolutions of the Cabinet of Ministers of the Republic of Uzbekistan dated October 21, 2003 No. 460 "On improving the management structure of the national holding company “Uzbekneftegaz”,
- Decree of the President of the Republic of Uzbekistan dated 21.08.2006 No. PP-446 "On measures to improve the organization of activities of the national holding company “Uzbekneftegaz”,
- Resolutions of the President of the Republic of Uzbekistan dated June 30, 2017 No. PP-3107 "On measures to improve the management system of the oil and gas industry",
- Resolution of the President of the Republic of Uzbekistan dated July 9, 2019, goal No. PP-4388 "On measures to provide the economy and the population with energy resources, financial recovery and improve the management system of the oil and gas industry.".

At present, “Uzbekneftegaz” JSC acts as the legal successor for all rights and obligations of “Uznefteprodukt” JSC, “Uzburneftegaz” JSC, “Uzneftegazmash” JSC, “Uzneftegazdobycha” JSC, “Mubarekneftegaz” LLC, “Shurtanneftegaz” LLC, “Gazlineftegaz” LLC , LLC “Ustyurtgaz”, LLC “Mubarek” GPP, LLC “Neftegazinvest”, LLC “Neftegazexport” and LLC “Uzneftegazgeologiya” [1].

The main objectives of the Society are:

To meet the needs of the economy and the population of the republic in oil products and gas;

Determination of the strategy and prospects for the development of the oil and gas industry, in terms of tactics and solution of problems the Company facing.

General management of the activities of joint-stock companies included in its composition, as well as enterprises and organizations that are part of the structure of the Company.

In accordance with the goals set, the Company solves the following tasks:

To pursue a unified technical policy in the field of production and processing of liquid hydrocarbons and gas, to increase the industrial potential of the oil and gas industry, mainly through the development of modern and successfully applied international technologies, to further increase the competitiveness of manufactured products, to ensure on this basis the sustainable development of the oil and gas industry, growth of export potential and the fullest satisfaction of the needs of the economy and population of the republic in oil and gas products;

Develop current, mid-term and long-term forecasts, target scientific, technical, economic and social programs for the development of the oil and gas industry;

To carry out a set of measures, including an increase in the volume of production, production and sale of oil, gas, gas condensate and products of oil and gas processing;

Attract direct investments, strengthen the role of shareholders in the course of strategic management of joint stock companies, and ensure openness of joint stock companies' activities and their attractiveness for potential investors;

To deepen the level of localization of production, to expand intersectoral industrial cooperation based on the use of mainly domestic raw materials and resources, to ensure import substitution and saturation of the domestic market with the necessary products and components;

Expand the volume and range of export supplies, assist exporting organizations in this industry, promote products to new external and regional markets, actively implement energy efficiency and energy saving standards;

To widely introduce modern information and communication technologies and software products, to ensure, on this basis, an increase in management efficiency and a reduction in production costs, transparency of the financial and economic activities of the organization.

The implementation of the set goals and the solution of the tasks allowed to prepare for development of new fields and put them into operation, as a result new prospects for the development of the industry were opened.

An alternative direction for the development of the industry is the production of synthetic oil based on high-speed pyrolysis technology. JSC "Uzbekneftegaz" plans to implement a significant number of investment projects in the coming years. Therefore, special attention is paid to attracting foreign investors to the country. Among the most important investment projects are projects implemented jointly with “Gazprom” and “Lukoil” (Russia), “CNODC” (China), “PetroVetnam”(Vietnam), “KNOC” (Korea), “SASO”L (South Africa), “Aral Project” Consortium and others.

In connection with the adoption of the resolution of the President of the Republic of Uzbekistan, significant changes were made to the structure of JSC Uzbekneftegaz [1]. Certain joint-stock companies left its structure (“Uztransgaz” JSC, “IGIRNIGM” JSC and a number of others), many enterprises lost their status of legal entities and came under direct subordination to the departments of “Uzbekneftegaz” JSC. In this regard, to ensure comparability, we analyzed the indicators of financial statements for 2019 (tab. 1 - 4) [2,3,4,5]

TABLE 1 - CONSOLIDATED BALANCE SHEET (MILLION SOUMS)

№	Balance sheet items	2018	2019
	ASSETS		
	1.Long-term assets		
1	Fixed assets	30 073,5	28 644,9
2	Intangible assets	2 135,9	67,5
3	Long term investment	6 679,8	4 234,6
4	Equipment for installation	260,3	433,6
5	Capital investments	6 318,0	21 904,4
6	Long-term receivables	42,5	4 813,0
	Total for section 1	**45 510,0**	**60 098,0**
	2.Current assets		
1	Inventory	9 997,6	2 090,1
2	Kelajakdagixarajatlar	32,5	21,5
3	Deferred expenses	275,7	558,8
4	Debtors	17 792,3	19 795,1
5	Cash	2 122,4	1 435,4
6	Short-term investments	1 690,4	342,0
7	Other current assets	366,3	5,0
	Total for section 2	**32 277,2**	**24 247,9**

	Total asset balance	**77 787,3**	**84 346,0**
	PASSIVE		
	1. Sources of own funds		
1	Authorized capital	14 415,5	14 629,1
2	Added capital	92,6	92,6
3	Reserve capital	1 537,1	8 863,5
4	Repurchased own shares	- 0,6	
5	Retained earnings (uncovered loss)	- 1 553,9	- 518,0
6	Minority share	- 141,7	1 071,8
7	Targeted receipts	12 797,6	12 740,3
	Total for section 1	**27 146,6**	**36 879,3**
	2.Liabilities		
1	long term duties	24 692,2	39 159,0
	incl. Long-term bank loans	19 156,4	37 214,7
	Long term loans	5 389,9	412,8
2	Current responsibility	25 948,5	8 307,7
	incl. Current payables	22 363,7	7 435,9
	Total for section 2	**50 640,7**	**47 466,7**
	Total liabilities of the balance	**77 787,3**	**84 346,0**

Based on the reporting data, it can be seen that by the beginning of 2020, the assets of Uzbekneftegaz amounted to 84 346 million soums. Of their total, long-term assets amounted to 60,098 million soums or 71.3% and increased by 32% over the year. Among them, more than 47.5% were fixed assets and 36.4% - capital investments. Thus, the structure of long-term assets can be recognized as efficient enough.

Current assets for the reporting year decreased by almost a quarter and amounted to 24 247.9 million soums. The decrease was mainly due to inventories and including production inventories, work in progress and goods by 7,907.5 million soums, or almost 80%, and cash by almost a third, or 667 million soums.

At the same time, the main share in current assets is still occupied by accounts receivable (81.6%), the volume of which increased by 11.3% over the year and reached 19 795.1 million soums. This, in essence, is the mortification (abstraction from active circulation) of financial resources.

The assets of the company are secured by its capital, which amounted to 47 466.7 million soums at the beginning of 2020 and decreased by 6.3% over the year. In the total amount of capital, 43.7% are borrowed by own funds and, accordingly, 56.7% are borrowed funds.

A positive point is that during the analyzed period, own funds increased by almost 36% or by 9,732.7 million soums), and borrowed funds decreased by 6.3% (by 3,174 million soums). The increase in own sources of funds was mainly due to an almost 6-fold increase (by 7 326.4 million soums) of the reserve capital. A positive moment is a significant decrease in current liabilities by 68% (by 14,127.8 million soums), of which almost 90% are current payables.

The growth of long-term liabilities is almost 2 times associated with the attraction of long-term bank loans for 18,058.3 million soums.

Analysis of the consolidated statements of financial results (Table 6) in conjunction with the data of the Statement of Equity (Table 7) showed that in the reporting year, profit before income tax amounted to 1,371.3 million soums with a loss admitted in the previous year in the amount of 654.7 million soums.

TABLE 2- CONSOLIDATED STATEMENT OF FINANCIAL RESULTS (MILLION SOUMS)

№	The name of indicators	2018 y.		2019 y.	
		Income	Expenses	Income	Expenses
1	Net proceeds from product sales	23715,0		15198,9	
2	Cost of products sold		20497,7		8842,9
3	Gross profit from product sales	3217,3		6356,0	
4	Period expenses - total		10859,9		3560,9
	incl. Implementation costs		*909,2*		*823,6*
	Administrative expenses		*587,1*		*240,7*
	Other operating expenses		*9363,6*		*2496,6*
5	Other income from operating activities	7630,0		985,8	
6	Profit (loss) from operating activities		12,5	3780,9	
7	Income from financial activities	6910,0		6136,3	
8	Financial expenses		7552,2		8545,7
9	Profit (loss) from general business activities		654,7	1371,5	
10	Profit (loss) before income tax (income)		654,7	1371,5	
11	Income tax (profit)		494,9		334,3
12	Other taxes and fees on profits		1441,1		0,1
13	Net profit (loss) of the reporting period		2590,6	1037,1	

TABLE 3 - STATEMENT OF EQUITY CAPITAL (MILLION SOUMS)

Indicators	Charter capital	Added capital	Reserve capital	Undisclosed profit(loss)	Repurchased own shares	Minority shares	Targeted receipts	Total
Balance at the beginning of period	14415,6	92,6	1537,1	-1553,9	-0,6	-141,7	12797,6	27146,6
Retained earnings (loss)				1035,9		1,2		1037,1
Other sources of equity financing	213,5		7326,4		0,6	1212,3	-57,3	8695,6
Balance at the end of the period	14629,1	92,6	8863,5	-518	0	1071,8	12740,3	36879,3

Financial assessment by types of activity of “Uzbekneftegaz” is concentrated in the Statement of Cash Flows. It can be seen from this form that “Uzbekneftegaz” JSC approached 2020 with a negative cash flow.

TABLE 4 - CONSOLIDATED STATEMENT OF CASH FLOWS (MILLION SOUMS)

The name of indicators	Income	Expenses
Operating activities		
Cash receipts from product sales	18 166,2	
Cash payments to suppliers for materials, goods, works and services	0,2	9 600,7
Cash payments to and on behalf of staff		725,8
Other cash receipts and payments from operating activities	5 554,2	4 353,0
TOTAL net cash inflow / outflow from operating activities	**9 041,1**	
Investment activities		
Purchase and sale of fixed assets	159,0	246,6
Purchase and sale of intangible assets	1,5	1,0
Purchase and sale of long-term and short-term investments	167,9	828,4
Other cash receipts and payments from investment activities	198,2	16 875,5
TOTAL net cash inflow / outflow from operating activities		**17 424,9**
Financial activities		
Interest received and paid	29,5	1 090,6
Received and paid dividends	110,9	0,7
Cash receipts and payments on long-term and short-term loans and borrowings	18 064,1	3 316,5
Other cash receipts and payments from financial activities	4 427,3	5 020,0
TOTAL net cash inflow / outflow from financial activities	**13 309,0**	
Taxation		
Income (profit) tax paid		355,3
Other taxes paid		4 478,8
TOTAL taxes paid		**4 834,1**
TOTAL net cash inflow / outflow from financial and economic activities		**91,1**
Foreign exchange balance from revaluation of cash in foreign currency	622,5	0,0
Cash at the beginning of the year	**721,7**	
Cash at the end of the year	**1 435,4**	

Operating activities made it possible to ensure a net cash inflow in the amount of 9,041.1 million soums, mainly due to proceeds from the sale of products and even subject to settlements with suppliers and personnel.

Investing activities brought an outflow of funds in the amount of 17 424.9 million soums.

Financial activities were more efficient and ensured an inflow of cash in the amount of 13,309 million soums, due to the attraction of long-term loans from banks for 18,064.1 million soums.

However, due to a significant amount of taxes to the budget (4,834.1 million soums when receiving profit before taxes in the amount of 1,371.5 million soums), in general, for "Uzbekneftegaz" JSC, the net cash outflow from financial and economic activities amounted to 91.1 million soums.

Thus, making a conclusion, it can be noted that there is still a lot of work to be done both to improve the structure and to eliminate factors that adversely affect the activities of the industry. Special attention should be paid to accounts receivable, the proportion of which remains high as before. Also, to improve the structure ofcapital (increase own funds) to improve the qualifications of personnel by stimulating the process, improving professional training.

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DMITRIY DMITRIEVICH SHOSTAKOVICH LIFE AND WORK

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ABSTRACT

The article contains a clip from the works and works of Russian composer, pianist, pedagogue, public figure. Classical music of the 20th century. People's Artist of Russia, Hero of Labor Dmitry Dmitrievich Shostakovich. Dmitry Dmitrievich Shostakovich's mother was an elementary piano teacher. Under his leadership, the future composer and his two sisters studied music. Her sister later became a professional musician. His childhood coincided with the events of a major historical century: the First World War, and the Great October Socialist Revolution. From the age of 9 to 11, he learns to compose music at home.

KEYWORDS: *Petersburg, Leningrad, Oratorio, Symphony, Allegro, Sonata.*

INTRODUCTION

Dmitry Dmitrievich Shostakovich is one of the most famous and victorious composers in the world, who is imperceptibly absorbed in modern classical music. Shostakovich was born on September 25, 1906 in St. Petersburg. Although his father was an engineer-chemist, he was a music lover, and his mother was a pianist and a gifted student at the conservatory."I grew up in a family that loved music" said the composer. "My mother, SofyaVasilevna, studied at the conservatory and was a good pianist. My father, Dmitry Boleslavovich, loved music and had a great voice. There were a lot of music fans among our family acquaintances and friends. They also took an active part in home music evenings".

Dmitry Dmitrievich Shostakovich's mother was an elementary piano teacher. Under his leadership, the future composer and his two sisters studied music. Her sister later became a professional musician. His childhood coincided with the events of a major historical century: the First World War, and the Great October Socialist Revolution. From the age of 9 to 11, he learns to compose music at home.

After studying at one of the private schools for some time, in 1919 at the age of 13 he entered the Petrograd Conservatory, majoring in piano and composition. Composer Alexander Konstantinovich Glazunov advises Shostakovich to choose the field of composition, to seriously deal with composition. (Glazunov was the director of the Petrogad Conservatory at that time.) Studied. When Shostakovich's father died in 1922, the family situation worsened. Glazunov provides a special scholarship for a gifted student. After the death of his father, Shostakovich was forced to find a job. Thus, he began working as a music illustrator at the cinema "Pariziana" on NevskyProspekt. This profession was very common in the era of voiceless cinema. He played the piano and gave a musical background to the movies that didn't come out. Later, this experience blinded the composer. In 1923, Shostakovich graduated from the conservatory with a degree in piano, and in 1925 with a degree in composition. While studying at the conservatory, Shostakovich created a number of works. Romances, piano pieces, symphonic scores. The largest of these is his first symphony. Symphony No. 1 was Shostakovich's dissertation. As you know, symphony is the most complex genre of instrumental music. Not everyone is fortunate enough to write a symphony at the age of 18-19. Therefore, on May 12, 1926, the first performance of the symphony took place. The symphony was recently performed in the United States under the direction of Bruno Walter and Otto Klemperer in Germany under the direction of Stokowski and Tuscany.

After graduating from the conservatory, the composer hesitates: whether I will be a pianist or a composer; had initially mastered both areas. In the second half of the 1920s, he came out as a pianist with solo concerts. Chopin, Tchaikovsky, Prokofiev performed concerts for piano and orchestra. In 1927 he participated in the Chopin International Competition in Warsaw and was awarded an honorary diploma. After a while, the musician decides to give up his career because his job was interfering with the composition. The composer's Second Symphony and Symphony III, written in 1929 for the October Revolution, are dedicated to May 1. From the music for the 1932 film The Encounter, UtrennyaPesnya (Dawn Song) became the brightest example of Soviet popular song. At the same time, Shostakovich wrote the opera "Nas" based on the satirical story of Nikolai Vasilevich Gogol about Major Kovolyov, who lost his nose (National Encyclopedia of Uzbekistan:2000, p.25).

In 1931, the ballet Bolt was staged. Shostakovich composed music for a number of films. He will meet Mayakovsky at the Meyerhold Theater. In this theater, Shostakovich directed the musical part. The music for the comedy "Klop" was very popular with V. Mayakovsky, but stopped with the untimely death of V. Mayakovsky. In addition, Shostakovich wrote music for performances at the Workers' Youth Theater. During 1930-1932, Shostakovich created the opera "Mrs. Macbeth of Mtsensk County" based on the work of Nikolai Leskov. On the stage of modern theaters, the opera will be renamed "Katerina Izmailova" and the genre of opera - tragedy satire. In January 1934, the opera was staged for the first time at the Small Opera House in Lelingrad and at the Musical Theater named after VI NemirovichDanchenko in Moscow. After a while, the opera was unfairly criticized and removed from the repertoire. And again in 1962. During these years, D. Shostakovich created a number of musical works, including 24 preludes for the piano. Dramatic ideas were reflected in symphonies 4, 5 and 6, written in the mid-1930s. Symphony No. 5 will be performed on November 21, 1937 in the hall of the Leningrad Philharmonic under the direction of conductor Yevgeny Mravinsky. Symphony No. 5 continues the traditions of Beethoven and Tchaikovsky (Gruber: 1953, p.54).

In addition to the symphony, the composer also works on chamber works. The first string quartet; He creates quintet works for piano, 2 violins, viola and cello. He was awarded the State Prize for quintet. In 1939, Shostakovich turned 33, when he became a professor at the Leningrad Conservatory. In his class, future composers such as Sviridov and Levitin took lessons. When he moved to Moscow in 1943, Karayev and Gali studied in his class. Thus, the Shostakovich school appeared. On June 22, 1941, the Great Patriotic War began. Shostakovich writes his 7th symphony The symphony was composed in July-December 1941(Musical aesthetics of the Western European Middle Ages and the Renaissance: 1965,p.74).

3 parts were recorded in the besieged city of Lelingrad, and the finale was completed in Kuibyshev. He leaves his hometown in obedience to the evacuation order Symphony No. 7 was performed first in Kuibyshev, then in Moscow, and then in the besieged Leningrad. Then abroad. In the summer of 1942, Symphony No. 7 was performed in New York under the direction of Tuscany (Rosenshild:1969, p.52).

Two years later he composed his 8th symphony. Symphony No. 8 is a tragic poem about the war. In the post-war years, the composer was engaged in public affairs. He worked in the Union of Composers of the USSR, first as a deputy to the RSFSR, and then to the Supreme Soviet of the USSR. In 1949, Shostakovich became a member of the Soviet Peacekeeping Committee. In 1954 he was awarded the International Peace Prize by the World Peace Association (Trigulova: 2008, p.39).

In the same year he was awarded the title of People's Artist of the USSR. In 1956, on his fiftieth birthday, he was awarded the Second Order of Lenin.

In 1966, he was awarded the title of Hero of Socialist Labor. From year to year the fame of the composer grows. Works of the 40s and 60s During the 25 years (a quarter of a century) after the war, the composer created many works in various genres. In 1947-1948, he gave a concert for violin and orchestra dedicated to David Oystrakh, with vocals for soprano, contralto and tenor accompanied by a piano entitled "From Jewish Folk Poetry". In 1949, E. Dolmatovsky wrote an oratorio "Song of the Forest" (Song of the Forests). In the early 1950s, "24 Preludes and Fugues" and "10 Choral Poems" were written on the poems of Russian revolutionary poets. One is for the piano and the other is for a working-class revolutionary song. The contrast of the centuries he created is typical of Shostakovich. In the 1930s and 1940s, he used revolutionary Russian songs in his music for films. This feature is later observed in symphonic music as well. In particular, in the music of Symphony No. 11, written in 1957, the symphony has a programmatic title, "1905," dedicated to the first Russian revolution.

4 parts have separate names, they are:

1) "Dvortsovayaploshad" (palace area).

2) "January 9"

3) "Eternal memory" (eternal memory)

4) "Nabat" (Bong).

Dedicated to the 22nd Congress in 1961, Shostakovich composed the 12th Symphony. Its name: "1917" is dedicated to the memory of VI Lenin. Symphony No. 13 is based on Yevtushenko's words and was written for a male choir and orchestra. Symphony No. 14, written in 1969, is for soprano, bass and chamber orchestra. One of the most philosophical works of the composer. His

last 15 symphonies were composed during the summer of 1971. He wrote poetry and humorous songs from Crocodile magazine (a publication similar to Mushtum). He was sometimes called a musical columnist. Shostakovich's lyrical and philosophical qualities are reflected in the quartets. The vocal series, written in the words of Alexander Blok, celebrates the eternity of creativity and beauty.

Dm. Dm. Shostakovich died on August 9, 1975.

7-symphony. C-stop.

Shostakovich is the author of 15 symphonies. This genre is extremely important in his work.Shostakovich is a master of orchestral writing. He thinks like an orchestra. Symphony No. 7 is one of the greatest works. The symphony was written in 1941. Most of it was written in Leningrad. The symphony premiered in August 1942 in Leningrad. In the besieged city, people were tired of playing the symphony. The remaining 15 people on the radio committee needed at least 100 people to perform the remaining symphony! Then, inviting all the artists in the City, the former musicians found army and navy orchestras and performed on August 9 at the Philharmonic Hall. The symphony orchestra was conducted by Karl IlichEliasberg. The score of the symphony includes a dedication written in the author's name “Named after Lelingrad”. Symphony No. 7 is compared to documentaries about the war. The symphony is called a “chronicle” or a “document” because it deeply illuminates the spirit of the time. The symphony is set against two opposing themes: creation, creativity, the world of reason, and the world of destruction and ignorance.

Good and Evil.

Part I is written in the form of an Allegretto-sonata. The main party theme is heroic and magnificent. It sounds like a do-major on stringed instruments. The accompanying part is played in a lyrical verb in the tone of the left major, the melody is performed by violins, the harmony is performed by the bass and cello. At the end of the accompanying party, the flute plays the piccolo solo and the trumpet violin. Development begins after exposure. The development begins with the attack of the famous Nazi invaders. This is an impressive picture of the power of destruction. The invaders start with a remote-controlled combat drum method. The whole record is written in the form of a variation on a single unchanging theme. The drum method also always beats. Orchestral timbres, registers, texture thickness, and dynamics change from variation to variation. New polyphonic sounds will be added. The verb of the subject is covered by all these means. The number of variations is 11. The sound of variation I is emphasized by the low-register flute timbre with a cool sound. Variation II plays the same flute with a piccolo flute at a distance of 1.5 octaves. Variation IV repeats each phrase played by the goboy by copying the bassoon one octave below. Variations IV-VII The fighting spirit of the music intensifies. Musical instruments (trumpet, trumpet, etc.) are included. The VI-variation theme begins to resonate in the forte nuance, expressed in parallel trinities. VIII-variation resonates in the nuance of the frightening fortissimo of the main theme. It is performed on a low register with 8 horns, wooden drums and stringed instruments. The xylophone, along with other instruments, now beats the automatic figure, which has been copied from Variation III. Variation IX The high-pitched tubes of the trombones add to the loud sound motif of the subject to the iron sound.

The last 2 variation themes have a ceremonial verb. It is as if an iron creature is moving (approaching) towards the right listener with a deafening noise. But suddenly there is a change of tone, consisting of trumpets, horns and trombones. Variational development, moving to the

development of processing, depicts an incomparably intense symphonic battle scene. The reprise begins. Both themes change significantly in the reprise. The theme of the main party resounds in the minaret, and its marching style takes on the significance of a mourning procession. The melody rises to the level of a powerful recitative. This is a speech aimed at all people. The accompanying part is at first clear, bright and lyrical, and when it comes to reprise, it is performed sadly in a low voice in a special minor lad (II and IV reduced lad lad). In the code of the first part, the theme of the main party returns again. He still plays the major, in violin. At the end a distant drumbeat and the theme of aggression are heard. The war continues. In Parts II and III, the destructive power of fascism is contrasted with man's spiritual wealth, the depth of his thinking, and his powerful beliefs.

Part IV. The exhausting final is full of attacking enthusiasm and confidence in the imminence of victory. Shostakovich's Leningrad Symphony deserves to be called the Heroic Symphony of the 20th century. In his works, Shostakovich always praises his love for his country, as well as his devotion to it. we can recognize him as a great person who encourages new directions by being attentive.

DmitriyDmitrievich Shostakovich's list of major works.

1.15 symphonies (including VII "Leningrad", XI "1905", XII "1917", XIII for bass, choir and orchestra dedicated to the memory of VI Lenin.

2. "Katerina Izmaylova" opera, "Nas opera".

3. Vocal-symphonic poem "KaznStepanaRazina" (execution of StepanRazin).

4. Oratorio "Song about the forests".

5. Concerts for violin, cello, piano and orchestra.

6. 15 string quartet.

7. Quintet for piano, 2nd violin, viola and cello.

8. A trio for piano, violin and cello.

9. 24 preludes and fugue for piano.

10. 24 preludes for piano.

11. Vocal series, songs (including "Song at the meeting", "Song of the world").

12. Music for movies. ("Meeting", "The Man with the Gun", "The Young Guard", "Hamlet", "Karl Marx" and others.

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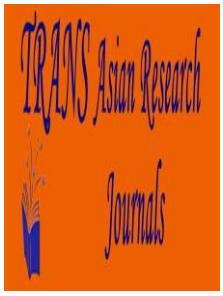

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ECONOMIC ANALYSIS OF THE DEVELOPMENT OF MAIN SECTORS OF AGRICULTURE

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ABSTRACT

The article presents the role of the agricultural sector in the country's economy, economic analysis of their main sectors in terms of economic activity, as well as the main problems and directions for the development of the sector.Effective implementation of these tasks requires the assessment and efficiency of agricultural economic activity of the regions, further improvement of the system of statistical indicators in agriculture, the study and forecasting of economic development of the industry in the regions by special statistical methods.

KEYWORDS: *Agriculture, Farming, Animal Husbandry, Farms, Cluster, Smart Farm.*

INTRODUCTION

Today, a number of scientific studies on improving the efficiency of agricultural production, improving the system of their economic and statistical indicators, a comprehensive economic and statistical analysis through averaging indicators, including statistical assessment of intensive agricultural development through the implementation of a systematic approach, and extensive multidisciplinary statistical analysis of quality. One of the priorities in world practice is to improve the methodology of agricultural statistical accounting and reporting systems, including the use of systematic statistical analysis, statistical assessment and forecasting of factors affecting the development of production of basic agricultural products.

In recent years, Uzbekistan has taken targeted measures to structural changes in agriculture, in particular, the development of agriculture on a multi-sectoral basis, financial support, development of the sales system. The Decree of the President of the Republic of Uzbekistan dated February 7, 2017 PF-4947 "On the Action Strategy for the five priority areas of development of the Republic of Uzbekistan in 2017-2021" pays special attention to the modernization and accelerated development of agriculture. In particular, "… reduction of areas under cotton and cereals, planting of potatoes, vegetables, fodder and oilseeds on vacant lands, as

well as further optimization of arable lands through the placement of new intensive orchards and vineyards; creation of favorable conditions for the promotion and development of diversified farms engaged in the processing, preparation, storage, sale, construction and provision of services, as well as the production of agricultural products; implementation of investment projects for the construction of new processing enterprises, reconstruction and modernization of existing ones, equipped with the latest high-tech equipment for deep processing of agricultural products, production of semi-finished and finished food and packaging products; Priorities such as storage, transportation and sale of agricultural products, further expansion of the infrastructure for agrochemical, financial and other modern market services" (Decree of the President of the Republic of Uzbekistan PF-4947).

Effective implementation of these tasks requires the assessment and efficiency of agricultural economic activity of the regions, further improvement of the system of statistical indicators in agriculture, the study and forecasting of economic development of the industry in the regions by special statistical methods.

ANALYSIS OF THE RELEVANT LITERATURE

The issues of assessing the socio-economic development and prospects of the agricultural sector have been studied by many scientists. In particular, in the research work of K.R. McConnell (McConnell:2003, p.399).A.Zabutyy (Zabuty:2012, p.25) and others, the socio-economic development of the agricultural economy was carried out on the basis of a conceptual approach, based on the characteristics of one or another country, V.N. Afanasev (Afanasyev:2003), A.P.Zinchenko(Zinchenko:1998, p.345), P.K.Kundius (Kundius:2010,p.570), B.I.Bashkatov (Bashkatov:2001,p.87), A.I.Gozulov (Gozulov:1967,p.267), Yu.E.Gaabelar (Gaabe:1964,p.502). In his work, he paid special attention to improving the statistical methodology and database of agriculture. Also in the assessment of economic development and structural changes in agriculture in Uzbekistan Berkinov (Berkinov:2007,p.23), T.Kh.Farmonov (Farmonov :2004,p.30), O.Z.Zokirov (Zokirov:2003, p.265), K.D.Mirzaev (Mirzaev:2011, p.200). In the scientific researches of N.Saidova (Saidova :2016,p.56), BTSalimov (Salimov:2004,p.22-23) and others the cultivation of the main types of agricultural products, the development of agriculture and animal husbandry in the regions, the factors influencing them, the potential and prospects of the regions are not studied statistically.

RESEARCH METHODOLOGY

Methods such as system analysis, statistical observation, averages, statistical aggregation and grouping, dynamic series, correlation and regression analysis, statistical modeling and forecasting were used in the research process.

ANALYSIS AND RESULTS

In order to achieve the main goal in agriculture, a variety of products are grown, works, services are performed, which are distributed and sold in order to meet demand. These processes, which take place at the level of enterprises, associations, industries (district, region, republic), are carried out on the basis of free market relations.

Agricultural products represent the total volume of agricultural production, determining the total value of agricultural and livestock products produced in the reporting period on farms, dehkan (personal assistant) farms and organizations engaged in agricultural activities.

According to our analysis, the highest growth rates of agricultural, forestry and fishery products (services) in the regions are Surkhandarya (105.6%), Fergana (104.8%), Namangan (103.8%), Kashkadarya (103.4%), It was registered in Navoi (103.2%) and Samarkand (103.1%) regions. In Syrdarya (100.2%), Jizzakh (101.0%) and Bukhara (101.6%) regions, on the contrary, growth rates were lower (Data of the State Statistics Committee of the Republic of Uzbekistan:2020).

Of course, the volume of agricultural products and services in the regions is directly affected by the area under agricultural crops. That is, as shown in Table 1 above, the sown area of all agricultural crops for the harvest of 2020 is 3373.4 thousand hectares (101.9% compared to the same period last year), including 1619.8 thousand hectares of cereals and legumes. (102.6%), technical crops 1105.8 thousand hectares (100.6%), including cotton 1050.7 thousand hectares (100.0%), potatoes 93.2 thousand hectares (103.9%), vegetables 224.2 thousand hectares (101.9%), food melons 60.6 thousand hectares (113.6%), fodder crops 269.0 thousand hectares (100.5%), fruits and berries 341.1 thousand hectares(101.3%), vineyards covered 126.0 thousand hectares (104.8%) (State Statistics Committee of the Republic of Uzbekistan:2021).

Of course, the volume of agricultural products and services in the regions is directly affected by the area under crops. In other words, Kashkadarya, Jizzakh and Samarkand regions have the highest area of all agricultural crops sown in the country for the harvest of 2020 (3373.4 thousand hectares), respectively, 455.8 thousand hectares (13.5%), 340.7 thousand hectares (11, 0%) and 371.6 thousand hectares (10.1%), while the lowest rate was 89.7 thousand hectares (2.7%) in Navoi, Namangan and Syrdarya regions, respectively, except for Tashkent (87 hectares). 185.4 thousand hectares (5.5%) and 193.4 thousand hectares (5.7%), respectively. Compared to the previous year, Tashkent, Syrdarya and Samarkand regions are leading with 108.4%, 106.5% and 103.9%, respectively, while Navoi and Fergana regions and the Republic of Karakalpakstan are 96.8% and 99.2%, respectively. and is in last place with 98.6% (Table 2).

TABLE 2.AREA UNDER AGRICULTURAL CROPS, TOTAL (ALL LANDS, HECTARES) [4]

	Farms of all categories	**Growth rate %**	**including:**					
			Farms	**Growth rate%**	**Dehkan (personal assistant) farms**	**Growth rate%**	**Agricultural organizations***	**Growth rate %**
Republic of Uzbekistan	3373376	101,9	2563289	97,7	473418	100,1	336669	157,9
The Republic of Karakalpakstan	259964	98,6	211102	95,3	32619	98,4	16243	179,1
provinces								
Andijon	218887	100,7	163340	92,1	28121	101,2	27426	2,2 м

Bukhara	239429	100,3	177606	95,1	43252	110,1	18571	147,9
Jizzax	371571	102,9	322883	101,8	23837	100,2	24851	122,8
Kashkadarya	455800	102,8	345670	99,9	68360	96,2	41770	159,4
Navoi	89 682	96,8	71 687	100,0	14 559	83,4	3 436	98,6
Namangan	185 400	99,7	146 195	95,8	29 149	100,1	10 056	2,4м
Samarkand	340 750	103,9	269 294	103,5	61 802	100,5	9 654	148,5
Surxondaryo	254 992	100,7	182 372	100,9	49 280	104,7	23 340	92,5
Sirdaryo	193 446	106,5	130 829	93,2	11 311	100,1	51 306	171,3
Tashkent	293 953	108,4	174 944	91,7	32 557	105,1	86 452	175,3
Fergana	251 461	99,2	198 278	98,3	40 734	98,4	12 449	121,1
Khorezm	217 954	99,6	169 089	96,1	37 750	97,1	11 115	2,7м
Tashkent	87	88,8	-	-	87	88,8	-	-

According to the categories of farms, ie all agricultural crops planted for the harvest of 2020 in the sown area (3373.4 thousand hectares) 2563.3 thousand hectares (75.98%), respectively, of farms, dehkans (personal assistants) and agricultural organizations, 473 , 4 thousand hectares (14.03%) and 336.7 thousand hectares (9.98%).

In terms of regions, the highest area of all agricultural crops planted on farms for the harvest of 2020 (2563.3 thousand hectares) is 345.7 thousand hectares (13.5%), 322.9 thousand hectares, respectively, in Kashkadarya, Jizzakh and Samarkand regions. (12.6%) and 269.3 thousand hectares (10.5%), while the lowest rates were in Navoi, Syrdarya and Namangan regions - 71.7 thousand hectares (2.8%), 130.8 thousand. hectares (5.1%) and 146.2 thousand hectares (5.7%).

In dehkan (personal assistant) farms, Kashkadarya, Samarkand and Surkhandarya regions have the highest rate in terms of the area under all crops planted for the 2020 harvest (473.4 thousand hectares), respectively, 68.4 thousand hectares (14.4%), 61, 8,000 hectares (13.1%) and 49.3 thousand hectares (10.4%), while the lowest rate was 11.3 thousand hectares in Tashkent (87 hectares), Syrdarya, Navoi and Namangan regions (respectively). 2.4%), 14.6 thousand hectares (3.1%) and 29.1 thousand hectares (6.1%).

According to the analysis, in 2020, all categories of farms will produce 7566.6 thousand tons (101.7%) of cereals, 3143.5 thousand tons (101.7%) of potatoes, 10459.5 thousand tons (102.4%) of vegetables. , 2134.4 thousand tons (103.2%) - nutritious melons, 2 864.0 thousand tons (104.0%) - fruits and berries, 1639.2 thousand tons (102.2%) - grapes (Data of the State Statistics Committee of the Republic of Uzbekistan:2020)..

When we analyze the total volume of agricultural, forestry and fishery products (services) grown in the leading sectors in 2020, the share of agricultural products amounted to 49.5%, or 123.6 trillion. soums or 103.4% compared to the corresponding period of 2019. The share of livestock products in the total volume of agricultural production amounted to 50.5%, or 126.2 trillion soums. soums or 102.1% compared to the corresponding period of 2019 (Data of the State Statistics Committee of the Republic of Uzbekistan:2020)..

Consistent implementation of measures to increase the domestic capacity of the livestock sector, as well as the provision of systematic state support to them has allowed to increase the number of livestock, to fill the domestic consumer markets with livestock products. Therefore, in 2020, 2526.2 thousand tons of live weight by all categories of farms. meat (2.1% more than in 2019), 11009.9 thousand tons. milk (an increase of 2.8%), 7825.0 million eggs (an increase of 0.7%), 35.7 thousand tons. wool (1.5% more) was grown and 144085 t. fish (18.4% more) were caught (Data of the State Statistics Committee of the Republic of Uzbekistan:2020).

To date, the total number of cattle in the country (as of January 1, 2021) has reached 13,188.7 thousand. Compared to the corresponding period of 2020, the number of cattle in all categories of farms increased by 239.0 thousand (1.8%). Of these, the total number of cows reached 4744.3 thousand. Compared to the corresponding period of 2020, the number of cows in all categories of farms increased by 80.8 thousand (1.7%). The total number of sheep and goats reached 22498.6 thousand. Compared to the corresponding period of 2020, the number of sheep and goats in all categories of farms increased by 591.7 thousand (2.7%). The total number of horses reached 254.0 thousand. Compared to the corresponding period of 2020, the number of horses in all categories of farms increased by 6.9 thousand (2.8%). The total number of birds reached 90,131.8 thousand. Compared to the corresponding period of 2020, the number of poultry in all categories of farms increased by 2272.1 thousand (2.6%) (Data of the State Statistics Committee of the Republic of Uzbekistan:2020).

As of April 1, 2020, the number of birds was 83.4 million, while as of April 1, 2021, the number of birds was 84 million (an increase of 100.4%).

Today, 8 million young chickens (from 1 to 90 days) are reared in large poultry farms in the country after rehabilitation, which are not recorded in statistical reports.

Due to a decrease in egg production in Tashkent region - by 5%, in Syrdarya - by 4%, the price of eggs in these regions increased by 7%, and in the country - by 3.6%.

Another factor in the decline in egg production is the cold winter days. The breeding temperature of the bird should be 20-22 degrees, and on severe cold days of winter, egg production decreases due to the decrease in temperature, and this is a natural process.

For information, we can say that 45% of the republic's poultry farms are poultry farms, 55% of the population.

The cost of everything comes from the cost, the cost of the product increases due to the cost of food, supplements, utilities and salaries. It should be noted that 15 types of poultry products are imported, and the price of eggs has risen due to rising prices abroad.

For comparison, as of May 19, 2021, the price of 10 eggs in the markets of Uzbekistan was 8,000-14,000 soums, in neighboring Kazakhstan the price of an egg (in our soum) was 3,000 soums, in Kyrgyzstan 2,000 soums and in Russia 2,500 soums. formed.

In 2020, a total of 7.8 billion consumer eggs were produced (the norm was 208 eggs per capita, 227 eggs were produced), and in 2021 this figure will reach 8.1 billion eggs (236 eggs per capita). 103.8 percent).

It is planned to establish 3 breeding farms in Kashkadarya and Surkhandarya regions, where 60,000 mother chickens will be raised ”(20).

About 500 clusters and cooperatives have been set up in fruit and vegetable growing, grain growing and animal husbandry. As a result, $ 1 billion worth of fruits and vegetables were exported despite the negative impact of the pandemic.

In general, "... the most effective factor in reducing poverty and increasing the income of the rural population is a sharp increase in productivity and efficiency in agriculture."

At the same time, the priority is to increase the income from each hectare of land from the current average of $ 2,000 to at least $ 5,000. To do this, we need to widely introduce the most advanced technologies in agriculture, water-saving and biotechnologies, advances in seed production, science and innovation.

The level of public services in rural areas, as well as transport and information and communication links, remains low. A comprehensive strategy and program development is required based on a detailed assessment of local needs and taking into account competitive advantages.

The main goal of agricultural development is to increase the volume and quality of agricultural products using the existing potential, increase the share of exports and strengthen the direction of their processing on an industrial basis.

“It is estimated that from the third year onwards, 5-10 million hectares of vegetables will be grown in such areas. It will be possible to earn around UZS. This figure is 2-3 million soums for fodder crops and oilseeds, 8-10 million soums for orchards and intensive orchards, and 25-30 million soums for growing fruits and vegetables in greenhouses through the use of alternative energy sources other than natural gas. soums.

In such areas it is recommended to cultivate fodder in most districts (6760 ha or 85.5% of the total area). This will increase the volume of livestock production by improving the supply of fodder in these areas.

It is planned to allocate 1,085 hectares or 13.7% of the total area for orchards and vegetable crops.

The main directions of agricultural development: viticulture; fruit growing; cultivation of tomorrow's agricultural products; cultivation of oilseeds; animal husbandry; beekeeping; fishing

Adopt a clear plan for the development of agricultural and food statistics; collection, comparison and publication of data on economic indicators of production of the main types of agricultural products (cost, income, profit, profitability); Development of a state program for the

development of "smart agriculture"; publication of a reference book (farm directory) containing the efficiency of production, state support of industries, labor legislation, taxation, lending and other necessary information; publication of a catalog of information and data on major domestic producers and processors; publication of the annual report of Agriculture (Agriculture annual report), which includes the measures taken and the results achieved in the field, as well as promising measures of state policy; active participation in information exchange platforms and international forums for the development of national systems and services in the field of agriculture and food; conducting agricultural registration (Agriculture census); introduction of a system of identification of farm animals, observation and monitoring of their movement.

Deciding on the type / breed of farm animals (defined quality and quantity indicators) on the basis of the use of necessary digital technologies in the introduction of "smart farm" technologies and the use of "digital herd" technologies, control and management of livestock, pasture proposals and recommendations for the introduction of new electronic reporting forms for monitoring traffic processes have been developed.

To ensure the compliance of the system of statistical indicators in the agricultural sector with the statistical laws and requirements, it is necessary to include: compliance of the system of indicators with the goals and objectives of economic and statistical research; ensuring that system performance is comparable; the existence of a single methodology for their calculation; logical interdependence of system indicators; the complexity and completeness of the reflection of the object of study. As the country's agricultural economy changes, so does the system of statistical indicators.

Monthly, quarterly and annual reports on the state of agriculture in national statistical practice; annual reports of agricultural enterprises; special registrations and accounts; Selective inspections of different categories of agricultural producers - sources of livestock statistics are used. The study developed scientific proposals for improving statistical reports in the field of agriculture and animal husbandry and their transfer to the method of selective monitoring.

CONCLUSION

As a result of scientific research, the following conclusions were drawn:

1. The main tasks of the economic and statistical study of the agricultural sector of the republic in the context of a pandemic should be: development of a program for statistical monitoring of the sector; identification of a system of statistical indicators describing the results of agricultural activities; analysis of the absolute level and intensity of changes in the scale of production of the main types of agricultural products; modeling and forecasting one-dimensional series of dynamics describing the results of agricultural activities; statistical analysis of various factors affecting the results of agricultural activities; modeling, forecasting of multidimensional series of dynamics.

2. A comprehensive assessment of the state and development of the agricultural sector is carried out on the basis of a system of economic and statistical indicators. These indicators reflect the status, development and sustainability of consumption of agricultural products at different levels of time and space. They allow to obtain a description of individual events and processes, their group states, and a description of the individual units

in the general complex.

3. Obtaining and comprehensive analysis of agricultural statistics is carried out at the regional, social and sectoral levels. The completeness and level of coverage of an objectively existing system of indicators depends on the level of management of the material and other capabilities of its study, the need for information and analytical tasks.

4. Decide on the type / breed of farm animals (established quality and quantity indicators) on the basis of the application of necessary digital technologies in the introduction of "smart farm" technologies and the use of "digital herd" technologies, control and management of livestock, proposals and recommendations for the introduction of new electronic reporting forms for monitoring the movement processes in pasture grazing.

5. To ensure the compliance of the system of statistical indicators in the agricultural sector with the statistical laws and requirements, it is necessary to include: compliance of the system of indicators with the goals and objectives of economic and statistical research; ensuring that system performance is comparable; the existence of a single methodology for their calculation; logical interdependence of system indicators; the complexity and completeness of the reflection of the object of study. As the country's agricultural economy changes, so does the system of statistical indicators.

6. The basis of economic and statistical research of agricultural activity is information that reflects changes in the number and composition of agricultural goods, livestock reproduction, agricultural production and industry efficiency indicators. Qualitative information that accurately reflects the state of the network allows you to make effective management decisions, both within each business entity and across the entire network.

7. The study used the method of economic indices in the process of assessing the interrelationships of the agricultural sector in the regions. Using the method of these indices, a multi-factor statistical analysis of the development in the network, the main trends and the factors influencing them was made.

8. In order to study the interrelationships in the field of agriculture at the regional level, it is necessary to use the method of correlation-regression analysis. These analysis methods have made it possible to objectively assess and analyze the relationship between outcome traits and factor traits in agriculture in the regions.

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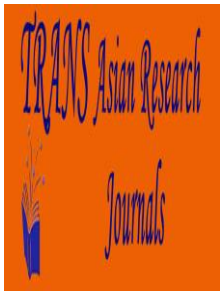

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AN OVERVIEW OF SOIL EROSION POTENTIAL LINKED WITH BIOMASS CROPS

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ABSTRACT

Energy agricultural production may take up to 60 million hectares in the United States, according to estimates. Biomass crop will most likely be grown in marginal farmland, which is often extremely erodible, due to economic concerns. Soil erosion must be addressed as a result of herbaceous as well as woody biomass agricultural crops. Even with continuous biomass extraction, perennial grasses offer year-round soil cover, preventing erosion. By increasing soil organic matter, soil structure, and soil water as well as nutrient-holding capacity, vigorous perennial herbaceous stands decrease water runoff and sediment loss and promote soil development processes. When compared to methods requiring more frequent or extensive tillage, minimum tillage management of row crops lowers erosion. Water erosion is reduced by woody biomass plantings because their roots and leaf litter improve water filtration, decrease water droplet effects, intercept rain or snow, as well as physically stabilize soil. When planted as shelterbelts, shelterbelts decrease wind erosion and enhance soil organic matter, soil structure, and soil moisture in their leeward zone, lowering soil erodibility. Increased erosion may accompany the harvesting of woody biomass plants. Clear-cutting in the forest, particularly on steep slopes, frequently leads in a significant increase in water erosion. As a consequence, even though it may result in increased harvesting costs, it is critical that hardwood biomass plantations be planned for rotational harvesting.

KEYWORDS: *Bio Mass, Energy Production, Soil Erosion.*

1. INTRODUCTION

The International Panel on Climate Change (IPCC) estimates that if measures are not done to limit the release of greenhouse gases into the atmosphere, global air temperatures would increase 0.38 degrees Celsius each decade and sea levels will rise 6 centimeters per decade. Because the

gases produced during biomass energy utilization were just recently withdrawn from the environment, the emission of CO2 from biomass energy utilization would not add to net world CO2 levels. With biomass values for energy generation of $30(US) Mg1 or less, it seems that biomass crops would only be competitive on marginal farmland, such as those now utilized for grazing and hay production or idled under government programs. A large portion of this terrain would be classified extremely erodible. It is thus critical to evaluate the effect of biomass production on soil erosion while evaluating its potential[1].

1.1.Biomass Land Resources Include:

There are about 200 million hectares of forest land in the United States, 140 million hectares of farmland, 47 million hectares of marginal cropland/pasture, and 32 million hectares under government programs.

In the United States, Robertson and Shapouri3 calculated that up to 60 million hectares might be converted to biomass production, the majority of which would be marginal land. Before converting ecologically sensitive regions to biomass energy generation, the systems' long-term viability must be determined. High erodibility or a history of cultivation that resulted in substantial erosion losses often lead to the classification of land as marginal. The lack of knowledge on the sustainability of biomass production on marginal land was identified as a significant restriction to the evaluation of biomass's involvement in global warming at a national workshop[2].

1.2.Effects Of Erosion On Soil Production

- Soil erosion has resulted in the loss of 430 million hectares of farmland globally, accounting for 30% of the global agricultural base.
- Soil loss has a detrimental impact on agricultural production parameters such as water holding capacity, soil nutrients, soil density, soil organic matter, and others.
- Furthermore, materials lost during water erosion accumulate in rivers, lakes, and reservoirs, causing future economic losses.

The reduction of soil water holding capacity is a major factor in decreased production. Slightly eroded soil retained 14 percent more water in the top 1 m than severely eroded soil, while maize on slightly eroded soil had substantially greater evapotranspiration levels when plant-extractable water dropped to 55-60 percent of total water holding capacity under moisture stress conditions. Soil formation takes a long time. It is predicted that the development of 2.5 cm of topsoil will take 100 years. On 39 million hectares of farmland in the United States, soil loss may surpass the recommended maximum sustainable rate of ca 11 Mg ha1 yr1. 8 According to Illinois estimates, soil erosion is excessive over 42 percent of the state's 10 million hectares of farmland. 9 Erosion decreases soil production in the long run. Due to variations in topsoil depth, subsurface composition and depth, the crop being produced, and other factors, the actual impact varies significantly. 10, 11 the rate of water erosion increases as the slope rises. 12 A Minnesota soil's long-term productivity loss due to erosion was estimated to be 5%, although it was higher on soils with a slope of >6%.13 in other instances, soil erosion may have a minor effect on production. Daniels et al. 11 evaluated yields of maize, barley, and soybean on mildly and severely eroded soils for 34 field years in North Carolina's Piedmont soils (Typic Hapludults) and found that average yield losses were just 0.1 Mg ha1 across all crops. The average annual crop value loss due to erosion was $4.44. (U.S.)[3].

1.3.Erosion Susceptibility Of Land:

Farmland susceptibility to erosion is one of the factors evaluated in the categorization of cropland in the United States. Only around 3% of the land in the United States is suitable for continuous cultivation with low erosion risk. About 40% of the rest of the land has row crop potential, however there are constraints to continuous planting, the most common of which is erosion risk. Conservation Reduced tillage techniques will be required on 22 percent of Class IIe land and all of Class IIIe and IVe land in Kentucky to comply with existing US agricultural policy compliance components. 14 There are about 5.5 million hectares of potential farmland (Classes IVI) in Kentucky's overall land area of 10 million ha. 15 However, more than 90% of this farmland is classified as Class II or III, with crop appropriateness and cropping patterns restricted. On about 75% of property in classes II–VI, erosion is the main issue. Drought and wetness are the major constraints on the remaining land[4].

The universal soil loss equation is used to calculate a site's vulnerability to water erosion (USLE). Soil loss is calculated using the equation:

Soil lossy = RKLSCP

R stands for Rainfall erosion index, K for soil erodibility, L for slope length, S for slope steepness, C for cover and management, and P for cropping practice. R values for predicting raindrop and runoff effects in the United States vary from 100 to 200 in the North Central area to 200 to 400 or more in the Southeast. The C factor is determined by the amount of canopy or mulch on the soil, and it has a significant effect on soil loss estimations. C values drop from 1 with no canopy cover to 0.15 with 100 percent canopy cover when there is no mulch. Raindrops are intercepted by plant cover, which lowers the power with which they strike the surface. Herbaceous Biomass is a kind of biomass that comes from plants[5].

Depending on production costs, crop value, and other variables, herbaceous biomass crop cultivation may be a viable land use choice on a significant portion of the 214 million hectares of arable and pasture land in the United States.

18 Keeney and DeLuca19 evaluated biomass energy production alternatives in the midwestern United States and found that ethanol from maize grain would not be a major source of energy in the United States because of the large energy inputs needed in its manufacture. Cellulosic feedstocks derived from woody species, agricultural wastes, or herbaceous energy crops may generate up to 28 EJ of energy, which is 818 times more than the energy produced by the US maize crop. In most systems, the greatest energy expenses were fertilizer and gasoline. 20 Reducing N fertilizer, herbicides, and tillage inputs in traditional corn production methods may result in a positive energy balance for corn. In Virginia's minimal tillage systems, the inclusion of legumes in mixes and crop rotations decreased energy inputs per unit of maize output. The next discussion will concentrate on the erosion potential of row crops and perennial sod crops for biomass generation[6], [7].

1.3.1. Crops Grown In Rows:

Tillage causes soil macroaggregates (>2 mm) to be disrupted, resulting in a loss of soil organic carbon. Tilled soils have a faster carbon turnover rate. The susceptibility of soil to separation by raindrops is linked to bulk density and varies with soil type and strength. Soil particles are separated by smaller, lower-energy raindrops in coarse grained, sandy, and lower bulk-density soils than in heavier, clay-type soils.

Sod crops that are perennial Surface water runoff is well controlled by plants that offer permanent cover, and soil erosion is almost non-existent. Browning29 cites data that demonstrate the benefit of sod crops in preventing soil erosion. Soil erosion and water runoff were far lower with sod cover than with conventionally tilled row crops, and soil loss was much lower than tolerable for long-term production[8].

1.4.Biomass Of Wood:

Plantings for riparian or other types of stabilization Trees have been planted to decrease water erosion by establishing a living buffer zone next to water courses, catching silt from eroding soil, boosting water infiltration, and physically stabilizing stream banks with their roots. Van Kraayenoord43 lays forth New Zealand's suggestions for poplar anti-erosion plantings. On slick slopes, particularly the sides of actively developing gullies, poplar plantings are suggested. They're utilized at the bottoms of gullies to keep the water flowing and create a silt and debris trap. To preserve streambanks, they are also suggested on the outer corners of meandering watercourses where the stream flow is greatest.

1.5.Plantations Of Biomass Blocks:

Forests are well known for protecting the soils on which they develop. After clear-cutting, severe water erosion may occur on steep slopes, particularly on shallow soils underlying rock48. This erosion not only lowers soil productivity, but it also causes greater sediment deposition and higher stream flows, which may result in downstream channel erosion. Rainfall-induced runoff and stream flow are reduced in block plantings owing to enhanced evapotranspiration and soil infiltration. The 20 percent decrease in water flow in a radiata pine-forested catchment relative to a pastured watershed with which it was paired was mainly owing to increased evaporation rates from wetted forest canopies, according to Fahey and Watson[9].

1.6.Shelterbelts

Shelterbelts are a kind of biomass plantation that is frequently planted on farmland for soil and crop protection, with additional goals of timber or biomass production and wildlife protection. In certain areas, wind erosion is a significant issue on exposed soil under annual farming. 66 Wind may transport soil particles in three different ways, according to research.

- Suspension: the clay fraction and organic materials may be physically broken down into such tiny particles that they get entrained in the windstream at high enough wind speeds.
- Saltation: Silt and sand particles, as well as tiny aggregates, travel over the soil surface via bouncing.
- Larger aggregates and sand particles slide over the soil surface, causing surface creep.

Shelterbelts protect the soil in their leeward zone from wind erosion. This is mostly owing to the fact that wind speed is decreased for up to 30 times the barrier height, and wind force at ground level is reduced, resulting in less dirt being carried. Because there is more soil organic matter in the protected region, the intrinsic erodibility of the soil is likewise decreased in the leeward zone of the shelterbelts. Due to better crop growth conditions and greater soil moisture in the protected zone due to winter snow treatment and decreased evapotranspiration during the summer, this has been built up over many years.

Shelterbelts are often used for winter protection and are regarded as an efficient method of catching blowing snow in regions with harsh winters. When shelterbelts are installed on sloping terrain, water erosion caused by melting snow in the spring has been seen near the shelterbelt. When snowmelt melts quickly and the surface soil is wet or frozen, surface runoff occurs. Snowmelt runoff patterns for a shelterbelt were studied for two years in a Saskatchewan research. Despite the fact that the snowdrift adjacent to the shelterbelt was almost similar in both years, the underlying soil characteristics resulted in drastically different flow patterns. When the soil became saturated in the autumn and froze, a significant part of the meltwater escaped, resulting in minor surface soil erosion. There was no runoff or erosion in the spring of the year when the soil was dry in the autumn[10].

2. DISCUSSION

Energy crop production may take up to 60 million hectares in the United States, according to estimates. Biomass crops will most likely be grown in marginal farmland, which is often extremely erodible, due to economic concerns. Soil erosion must be addressed as a result of herbaceous and woody biomass crop development. Even with continuous biomass extraction, perennial grasses offer year-round soil cover, preventing erosion. By increasing organic matter in the soil, soil structure, and soil water and nutrient-holding capacity, vigorous perennial herbaceous stands decrease water runoff and sediment loss and promote soil development processes. When compared to methods requiring more frequent or extensive tillage, minimum tillage management of row crops lowers erosion. When assessing the utilization of land and water resources for biomass power crops, potential effects on soil erosion and soil productivity sustainability must be addressed. With proper care, herbaceous perennial plants, especially grasses, provide year-round protection and minimal soil erosion. The development of these species enhances soil productivity by increasing soil organic matter, improving soil structure, and increasing soil water and nutrient-holding capacity.

3. CONCLUSION

Potential impacts of biomass energy cropping on soil erosion and soil productivity sustainability must be considered when evaluating the use of land resources for biomass energy cropping. Herbaceous perennial plants, particularly grasses, offer year-round protection and little soil erosion with appropriate management. Soil productivity is often improved by the growth of these species, which increases soil organic matter, improves soil structure, and increases soil water and nutrient-holding capacity. Tillage for the development of annual plant crops exposes sensitive soils to significant erosion risk; nevertheless, as compared to systems requiring more frequent or extensive tillage, minimal tillage row crop systems may significantly minimize soil erosion. Woody biomass crops are typically justified more on the basis of their soil conservation advantages than their commercial potential since they reduce soil erosion by wind or water. Soil erosion may occur in woody biomass plantings in certain cases. As a result, this potential must be considered in plantation design or site selection.

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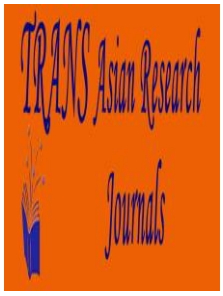

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E-LEARNING WEB SERVICES AND THEIR CONFIGURATIONPOLICYWITHIN TERMS OF SOA

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ABSTRACT

With the introduction of sophisticated communication technology, the idea of e-learning came into reality. Most of the e-learning systems are functioning in client server and distributed system settings. The activity of e-learning remained limited to specified requirement owing to the absence of appropriate dynamic software architecture of modern technologies. With the introduction of service-oriented architecture (SOA), an appropriate and superior solution framework has been suggested for e-learning. Different functions of e-learning system are implemented as stand-alone web services. The strength of the method adopted in this article is reusability and interoperability. To accomplish the new functionality in e-learning system, the construction of appropriate stand-alone web services is needed to make the system completely capable of interactive services making electronic teaching learning possible. Web service composition is a SOA-based methodology to create a composite web service using existing stand-alone or other composite services. In this article, we propose a full-fledged e-learning system with the assistance of web services and their construction as per SOA standard.

KEYWORDS: *Composite Web Service, E-Learning, Moodle,Service-Oriented Architecture (Soa), Web Service.*

1. INTRODUCTION

Nowadays, e-learning is the most needed service in the universities as well as in businesses to offer the training to their workers at their own location and at any moment of the users' choosing. From the developer point of view, the structure of these e-learning systems is extremely complicated. Previously, e-learning systems were client server based; later, it moved to distributed environment, and now, with the introduction of SOA, they are moving towards service-oriented architecture (SOA) (SOA). There is a further growth of cloud services in single

cloud and multicloud; nevertheless, the scope of the article enables to proble construction of web services in SOA. In SOA-based E-learning system, each feature is built as stand-alone web service, and their compositions offer increased capacity of the system [1]. But composition of web services is still a challenge since still there is no common standard owing to multi-vendor service incompatibility.

Web service composition is a highly significant service-orientated concept and is also known as service assemblies. Composition offers new capabilities by building new services from current and dispersed services all across the web. Basically, web services are software platform-independent programs that export a description of their capabilities and make it accessible using standard protocols. Web services interact utilizing open protocols and are self-contained as well as self-describing. By utilizing web services, one may plug in and instantly utilize new components as simply as if the capabilities are accessible in software libraries. SOAP, UDDI and WSDL are the fundamental components of the web service implementation. It may be found using UDDI [2]. UDDI (Universal Description, Discovery and Integration) is essentially a search engine for web services and is itself a web service. Web service provides the possibility to the execution of business on dispersed network and may be accessible via standard interfaces and protocols.

Web service composition offers additional capabilities, created by merging pre-exiting services. But the difficult problem is the assembly of these services to offer additional functionality. There are various methods for fulfilling such goal. Some offer semi-automatic tool [3]. In this article, we describe a SOA-based e-learning web services composition built using ASP.NET, as an example. These services are registered in the local Universal Description, Discovery and Integration (UDDI) as per publish–subscribe scheme of SOA. The compilation of these services is done using the address and the availability of relevant services from previously set UDDI.

1.1. E-Learning Web Services Publish and Subscription

E-learning system consists of a variety of online services; some of them are main web services and others are secondary. But both main services and secondary services are equally essential. The distinction is brought out in their usage and functioning. Primary services are those which are utilized for the coordination of other such like UDDI service and compatibility checking service. Secondary services comprise completely functioning stand-alone services such as registration service, online examination service, virtual courses[4]. In e-learning system, local UDDI is really set UDDI for service in Microsoft Web Server 2008.

Registration service, computer programming service (lectures in text form), computer programming service (lectures in audio/video form) and virtual courses are built on various systems as services then registered with the service provider's name to UDDI via publish service of UDDI. UDDI service needs providers name and the services WSDL file for its publishing in UDDI registry. The client system looks for necessary services and determines their location via UDDI which has previously been setup. Searching e-learning online services in UDDI is usually bound by the selection of terms related to the web services, e.g. identity management, authentication, digital certificate, etc. Web services may be searched in UDDI by their keywords as described above. Search function of UDDI provides the service provider name, service location with other information, which comprises of WSDL detail as shown in Figure 1.

Figure 1: Users Dealing with the System

E-Learning Web Services Composition Methodology Web service composition methodology is worked out with the help of a limited number of services of e-learning. Four types of e-learning services are offered to users: – Computer programming service (lectures in text format) – Computer programming service (lectures in audio/video format) – Online examination service – Virtual classes. Each of these services is stand-alone and is totally independent service from others. Besides these services, there is one more service called registration service. This is also a stand-alone and independent service but provides authorized and authenticated service. The registration service is required to be composed with the services mentioned above (Figure 2).

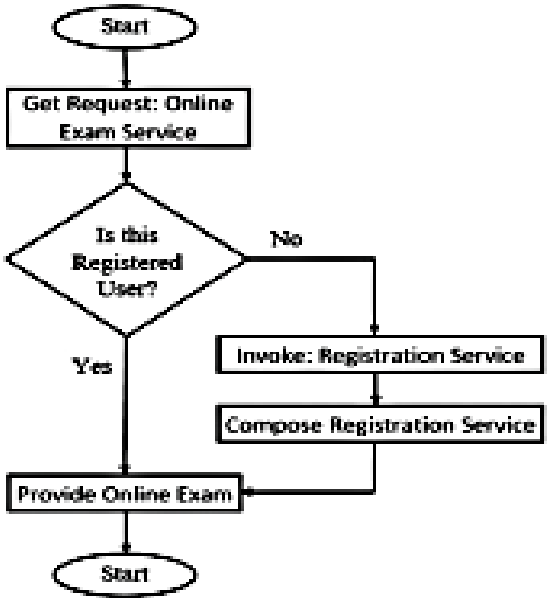

Figure 2: Providers Dealing with The System

1.2. Online Examination Service Composition with Registration Service

As soon as user chooses the online examination service, user is routed to registration service. Registration service verifies the user. If the user is already enrolled, registration service enables user to go back to online examination service. Otherwise, if user is not previously registered, then it is sent to registration procedure. After obtaining successful registration, customer returns back to online examination service. As soon as the user completes the test, outcome of the examination is shown on the screen[5]. At server side, when server receives the request for online examination service, it sends user for his registration service, if user is registered, then server again redirects the user to online examination service where he is permitted to write the examination. If the user is not registered, then it calls the registration service and combines it with online examination service.

2. LITERATURE SURVEY

With the advent of cloud services, there are a variety of service delivery models of e-education system rather than an e-learning system. But for theoretical and research-related tasks, e-learning mechanism produces productive outcomes. In reality, the point occurs to be one of our reasons to build up composition of web servicesin e-learning. Sbitneva et al. used an onto semiotic approach for investigation into applications of theoretical constructs and techniques to analyze the learning process in the e-modality of linear algebra course[6]. The exercises are designed to create deeper understanding for the topic.

Pattnayaka and Pattnaik made an effort for the integration of online services in order to create a knowledge society[7]. Web 3.0 has been utilized for such addition to information base. Group work, question and answer sessions have been included as web 3.0 is capable of using artificial intelligence (AI) method speeding up teaching learning. However, such initiatives cannot proceed without a baseline of security.

A powerful e-learning service using Moodle platform is GakuNinMoodle. The service delivery paradigm was created and built with appropriate security measure in Japan by Ueda and Nakamura[8]. In reality, the document supports security awareness education. These latest implementations of learning management systems (LMSs) in Moodle platform and creation of models for test and train indicated a revived interest in the use of web services in e-learning. Systems based on web services are primarily utilized in the area of e-commerce. Travel and tourist systems and financial systems are some of them.

Client server-based LTSA framework like stand-alone service components does not own any obligation towards providing themselves for preparation of composite services. The composition compatibility of services simply comes as an afterthought in this architecture making it a restricted service architecture[9]. Learning content provider (server) may not be able to resolve concurrency. Replication of provider owing to various modifications may make data inconsistent. A full-fledged e-learning-based online services and their composition are yet to emerge. To enable web service composition, there are a variety of models and frameworks each having its advantages and drawbacks. IEEE LTSA is a highly appropriate model for such purpose, since it has previously been modified according to the e-learning web service need.

Composite services may be accessible via a registry under popular publish–subscribe system. Types of e-learning include synchronous and asynchronous e-learning method. The expanded IEEE LTSA's characteristics are as follows[10]:

- The e-learning online services exist on various places on separate serverson different servers.
- These web services are registered in UDDI (web services location may be discovered at UDDI) (web services location can be found at UDDI).
- A client may utilize these web services via the UDDI and can contact these functions anywhere to create an e-learning system with the assistance of these services even if these services are in various physical locations.
- In this architecture, provider/operating server is at application layer handling services composition as well as service compatibility.

SOA-based extensible platform is built on model-driven architecture (MDA) and SOA. MDA is classified into three abstraction layers such as CIM, PIM and PSM. Computation-independent model (CIM) provides comprehensive information about business use case, company structure and business processes. Platform-independent model (PIM) comprises of analysis and design which defines services in technology independent way. Platform specification model (PSM) is used to create the major portion of the code.

Service bus offers the required communication infrastructure. It also offers centralized administration for services. Service bus platform on SOA includes business modelling procedures. It combines modelling tools and business process-based development platform to design and build information management system. A framework for the semantic composition of web services managing user constraints may be described as the procedure that defines how to choose, combine and execute a collection of accessible web services to get a composite service which fulfils the users' demands. The system is built on networked architecture, on semantic uniform ontology and on community service descriptions. Community services having the same ontology are regarded as an integrator of services. Business Process Execution Language (BPEL) offers a framework for formalism of the system. Web service definition is expressed using UML in the form of message sequence charts and converted into a finite-state process (FSP) (FSP). Labelled Transition System Analyser (LTSA) is used to verify whether a web service composition meets the specification highlighting discrepancy, if any. However, most of these related formalisms (BPEL, UML, FSP and LTSA) have been separately developed, and there is no obvious relationship between them.

3. DISCUSSION

The user chooses more than two services and wishes to utilize services in succession. Let the user choose computer programming and online examination service. Next, he utilizes login or registration service to access them in a series. If the first service (computer programming) is unsuccessful, then the second service is not called by the server and an error message will be shown to user by frontend service. Each of these services is stand-alone and is completely separate service from others.

Besides these services, there is one additional service called registration service. This is likewise a stand-alone and autonomous service but offers approved and authenticated service. The registration service is needed to be constructed of the services listed above. If user is not able to access, then, to study computer programming, he is regarded unprepared for writing the examination of computer programming. The pseudocode of second situation is expressed as follows:

Data Structures being any e-learning composition represents a class of services. It also utilizes a flag. The flag indicates whether the service is successfully called or not; true value signifies service is called successfully; and in case of any error, it is assessed as false.

4. CONCLUSION

The expanded IEEE LTSA e-learning framework in SOA offers enormous potential for different services composition; even on a cross-platform, cross-service provider scenario may be used. Integration of a number of services is feasible only on Semantic Web. This article offers a peek into service composition of two or three services in ASP.NET that are compatible. The idea of forward and backward compatibility would deal with the composition in a fine-grained way that has been chosen as the future path of study. The implementation of idea needs further expansion of the existing model in Semantic Web-based paradigm. With the advent of cloud services, services composition takes a new assemblage with third-party agency service. There are a lot of cloud agents or brokers offering whole or part a service. Such mechanism requires an investigation in future direction of work.

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CONSTITUTION: NATIONAL ELECTION LEGISLATION AND INTERNATIONAL STANDARDS

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ABSTRACT

This article organizes national use and international measurements at the beginning of an election. Compliance with the Constitution and the Electoral Code of the Republic of Uzbekistan on fundamental international principles and measures in the field of suffrage has been thoroughly studied. The great founders are considered on the example of separate relevant models of the Constitution and the Electoral Code of the Republic of Uzbekistan. It also provides information on international universal instruments on the basis of elections and the principles of international electoral law. The importance of the Electoral Code in another new edition is highlighted.

KEYWORDS: *Constitution Of The Republic Of Uzbekistan, Electoral Code, National Electoral Legislation, Electoral Law, International Legal Documents, Implementation, International Principles And Standards, New Uzbekistan, Political Rights, Civic Position, Democracy, People, Citizen, State Power, Electoral And Electoral Rights , Electoral Principles, Openness And Transparency, Legal And Political Culture, Political System, Development.*

INTRODUCTION

Electoral processes play a special role in the study and analysis of the democratization of the state. Because "suffrage" is one of the political rights of citizens and plays an important role in the formation of state power. This is stated in Article 32 of the Constitution of the Republic of Uzbekistan "... citizens of the Republic of Uzbekistan have the right to participate in the management of public and state affairs directly and through their representatives".[1] This norm is also stated in Article 6 of the Electoral Code, including "The President of the Republic of Uzbekistan, deputies of the Legislative Chamber, deputies of local Councils are directly elected by citizens".[2] In this regard, the modern suffrage in our country is an important constitutional institution that clearly demonstrates the power of the people. This is stated in Article 7 of the Constitution of the Republic of Uzbekistan, which states that "the people are the sole source of

state power".[1] The democratic elections associated with the formation of which have become an integral part of the political system.

The basis of the electoral legislation of our country fully complies with the universally recognized principles and norms of international law, which constitute a set of international electoral standards for free and democratic elections. As noted in the preamble to the Constitution of the Republic of Uzbekistan, this country recognizes the "supremacy of the universally recognized rules of international law".[1]

MAIN BODY

It is known that since the second half of the twentieth century, the issue of suffrage and freedoms of citizens has become a serious issue for influential international organizations. Currently, there are more than 20 international regulations in the field of human rights and freedoms.[3, Pp.19-33.]

Principles and standards in the field of suffrage are enshrined in a number of international universal instruments of the United Nations, in particular Article 21 of the Universal Declaration of Human Rights (December 10, 1948)[4] and Article 25 of the International Covenant on Civil and Political Rights (December 16, 1966)[5], Article 5 of the International Convention on the Elimination of All Forms of Racial Discrimination (December 21, 1965) [6], Article 6 of the UN Declaration on the elimination of all forms of racial discrimination (November 20, 1963) [7].

Regional international organizations also have their own European Convention for the Protection of Human Rights and Fundamental Freedoms (1950) [8], American Convention on Human Rights (1969) [9, p. 58], African Charter for Human and Peoples' Rights (1986) [9, p.94] international legal instruments such as reflected. In particular, the main figures in the field of democratic elections in Europe, the organization for security and cooperation (OSCE), in particular, are reflected in the Copenhagen document on human criteria (1990).[10, p.8]

The following principles in the field of suffrage are recognized in modern international law:

- Universal suffrage;
- Equal suffrage;
- The right to vote directly;
- Election by secret ballot;
- Regular and mandatory elections;
- Open and transparent elections;
- Free elections;
- Real elections;
- Fair elections;
- conduct of elections by independent election commissions;
- State financing of elections and election campaigns of candidates, political parties;
- Informational support of elections and campaigning by the state;

- Participation of national and international observers in the elections;

- Complaints of citizens about violations of their voting rights and freedoms, for which appropriate liability is provided;

- Measures that are not considered discriminatory.

All of these principles and rights, together, constitute international electoral standards.

In our country, too, the electoral legislation has been improved in accordance with national experience and international standards, in line with the reforms. To date, in addition to the norms enshrined in the Constitution of the Republic of Uzbekistan in the field of elections, about 10 more unified legislative acts of the Republic of Uzbekistan have been adopted. It is noteworthy that the improvement of electoral legislation has been based on electoral practice, and in turn, electoral legislation has also given a major impetus to the development of electoral practice. However, electoral legislation is such an area that it needs to be constantly updated in line with the times.

In this regard, the President of our country Sh.M.Mirziyoev in his first Address to the OliyMajlis on December 22, 2017 put forward the initiative to develop and adopt the Electoral Code of the Republic of Uzbekistan. In order to fulfill this important task, a special working group was set up in the Central Election Commission to draft a code. It should be noted that during the preparation of the draft Electoral Code, the Electoral Codes and laws of France, the Netherlands, Canada, Italy, Sweden, Belgium, Poland, Albania, Belarus and Azerbaijan were studied. Analyzes have shown that the Electoral Code has now been adopted in more than 40 countries.

On June 25, 2019, the Electoral Code of the Republic of Uzbekistan was adopted. The Electoral Code systematizes the national electoral legislation into 5 existing laws, namely, "On Elections of the President of the Republic of Uzbekistan", "On Elections to the OliyMajlis of the Republic of Uzbekistan", "On Elections to Regional, District and City Councils of People's Deputies", The laws "On the Central Election Commission of the Republic of Uzbekistan", "On guarantees of citizens' suffrage" and a number of legal acts were mutually unified and stated in a unified manner. In addition, more than a dozen international election documents were analyzed in detail, and their main ideas and standards were reflected in the Electoral Code. In general, the Constitution of the Republic of Uzbekistan and the Electoral Code has implemented all the basic international electoral standards.

First, the Electoral Code strengthens the guarantees that ensure the free expression of the will of citizens of the Republic of Uzbekistan. [Article 2, 1] these rights and freedoms were guaranteed in the Constitution of the Republic of Uzbekistan. In particular, Article 117 of the Constitution of the Republic of Uzbekistan states that "... every voter has one vote. The right to vote, equality and freedom of expression of the will are guaranteed by law"[1] is the basis of the organization. **Second,** citizens of the Republic of Uzbekistan have the right to elect and be elected to representative bodies of state power.[Article 117, 1] these rights are enshrined in the Constitution of the Republic of Uzbekistan. In the new electoral code, all the procedures for exercising these rights are systematized. That is, this Code regulates relations related to the preparation and conduct of elections of the President of the Republic of Uzbekistan, deputies of the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan, members of the Senate of the OliyMajlis of the Republic of Uzbekistan, deputies of regional, district and city Councils of people's deputies.[Article 1, 2]*Thirdly*, the electoral legislation of Uzbekistan enshrines the

principles of international suffrage on the basis of universal, equal and direct suffrage by secret ballot. According to the Constitution of the Republic of Uzbekistan, citizens of the Republic of Uzbekistan over eighteen have the right to vote. [Article 117, 1.]

Elections of the President of the Republic of Uzbekistan, deputies of the Legislative Chamber and deputies of local Councils are general.

Citizens have equal suffrage regardless of gender, race and nationality, language, religion, social origin, beliefs, personal and social status, education, type and nature of occupation. [Article 4, 2.]

Every citizen participating in the election will have one vote.

Citizens, who have been declared incompetent by a court, as well as persons detained in places of deprivation of liberty by a court decision, may not be elected.

Citizens, who have been declared incompetent by a court, as well as persons detained in places of deprivation of liberty for the commission of serious and very serious crimes, shall not participate in elections. [Article 5, 2.]

The President of the Republic of Uzbekistan, deputies of the Legislative Chamber, and deputies of local Councils are directly elected by citizens. [Article 6, 2.]

The election will be free and secret ballot. It is not allowed to control the will of the voters.

Secret ballot is ensured by creating appropriate conditions that preclude the possibility of any control over the will of the voter. [Article 7, 2.]

Fourth, the principle of openness and transparency in the preparation and conduct of elections in the Electoral Code is also of particular importance. According to him, the preparation and conduct of elections will be carried out by election commissions in an open and transparent manner.

Election commissions inform citizens about their work, formation of constituencies, precincts, composition of election commissions, their location and working hours, voter lists, lists of political parties participating in the elections, the President of the Republic of Uzbekistan, deputies of the Legislative Chamber, local Councils. Information on candidates for deputies, as well as on the results of voting and elections.

The media will cover the preparations for the election and how the election is going.

Meetings of election commissions shall be open. Decisions of election commissions shall be published in the mass media or made public in accordance with the procedure established by this Code.

In all events related to the preparation and conduct of elections, as well as on election day in the polling stations and counting of votes, observers from political parties, citizens' self-government bodies, media representatives and other countries nominated by candidates for President of the Republic of Uzbekistan, deputies of the Legislative Chamber , observers from international organizations are eligible to participate. [Article 8, 2.]

Fifth, the legal framework for the conduct of elections in our country on the basis of democratic principles has been created and improved. The basis of the electoral legislation is the Constitution of the Republic of Uzbekistan. The Electoral Code, which consists of 18 chapters

and 103 articles, regulates relations related to the preparation and conduct of elections of the President of the Republic of Uzbekistan, deputies of the Legislative Chamber of the OliyMajlis of the Republic of Uzbekistan, members of the Senate, regional, district and city Councils of People's Deputies. Establishes guarantees that ensure the free expression of the will of the citizens of the Republic.

CONCLUSION

Elections determine the free will of the people and ensure its direct implementation. The electoral legislation of Uzbekistan allows voters to freely choose and elect candidates. The current elections in Uzbekistan are based on political pluralism, diversity of ideas and multiparty system. As a full member of the international community, our country recognizes the above-mentioned international standards on elections, the rights and freedoms of citizens in elections and is taking consistent measures to further strengthen the rights and freedoms of elections in the country.

Most importantly, the implementation of the Electoral Code legally guarantees the introduction of new, advanced practices that will ensure a more democratic and transparent electoral process in our country. This, in turn, is an important factor in further democratization of the political system of the country and deepening the process of political modernization.

Therefore, the time has come to realize that in today's Uzbekistan, through the active participation of citizens in elections, they are given the opportunity to choose their own future. As our President ShavkatMirziyoyev said, “In the election process, first of all, our worldview, political and legal culture, our civic position will be reflected once again”.[11] This legal and political culture of citizens, their position in life ensures the democratization of the state and society. After all, the main idea of the new state of Uzbekistan is that government agencies serve the interests of the people. The political interests of our people are guaranteed in our national legislation in accordance with international standards. Only our citizens will be able to contribute to the further development of our country, effectively using the rights and freedoms guaranteed by our state, the opportunities created.

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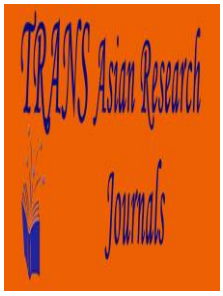

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RESEARCH PROTECTIVE METAL COATINGS TO FACE THE ELEMENTS

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ABSTRACT

This article describes the methods of coating polymer coatings and the work efficiency of the coating coated details. Polymeric coatings are made of polymeric materials and can be applied on a number of substrates using a variety of methods such as extrusion/dispersion and solution casting techniques. Polymeric coatings provide excellent adherence to and protection from the environment.

KEYWORDS: *Polymer, Coating, Corrosion, Property, Matrix, Environment, Surface.*

INTRODUCTION

In today's fast-paced time, synthetic raw materials are replacing natural materials. In particular, polymerized polymer materials have become the main raw material for the manufacturing industry. Polyethylene, polypropylene, phenol-formaldehyde and other types of polymers are widely used in industry. The advantage of thermoplastic polymers is that they can be recycled. We can also see this process in the production of film and fiber. Coatings made of thermoplastic polymers, especially films, which protect the metal surface from corrosion and the external environment are very important.

METHODS AND OBJECTS OF RESEARCH

The word polymer is derived from a Greek word, where "poly" means many and "mers" means particles. So, polymer can be described as a combination of identical molecules called mers. Polymers are composed of repeat units of small compounds called monomers. Different polymers show different properties, depending upon how the monomers are linked with each other. Some polymers are hard, such as bakelite and glass; whereas some are soft, such as biopolymers, silk, and rubber. Polymers are found to have several and the use of both natural and man-made polymers is widespread in applications our society. The natural polymers include proteins and polysaccharides, and the man-made polymers include synthetic plastics and fibers.

Their applications range from households to industries such as transportation, aviation, and pharmaceuticals. Their extensive use is in the area of medical devices, food packaging, decoration, transportation, $[-CH_2-CH_2-]_n$ information technology, and so on. Polymers are represented by repeating structural units called monomer. For example, a simple and long-chain polymer polyethylene, with ethylene as a repeat unit and n as its number of repetition, is expressed as follows:

The dissolution of polymers is different from the low-molecular-weight compound. Long dissolution time and enhanced viscosity of their solution make them unique. To obtain homogeneous solution, one can make use of solubility parameters and predict the solubility of polymer in the solvent. When these data are not available, trials with various solvents would be needed.

Polymeric coatings are made of polymeric materials and can be applied on a number of substrates using a variety of methods such as extrusion/dispersion and solution casting techniques. Polymeric coatings provide excellent adherence to and protection from the environment. They are so designed that they adhere well to the substrate and not peel off easily, nor degrade due to heat, moisture, salt, or chemicals. Coatings are made up with different ingredients such as solvent, additives, and thinners. Different ingredients play different roles in coatings, such as additives enhance the functional properties. Similarly, thinners reduce the viscosity of the mixture, making the final coat appear smooth and without any defect.

Coatings are mainly used in the following sectors:

- **Transportation**: The coatings provide protection from weather such as heat/ light, corrosion, and scratches from accidents such as dents.
- **Household**: The coatings provide finishing to kitchen appliances, such as Teflon coating and anti heating properties to utensils.
- **Medicines**: The coatings are used to coat drugs and thereby reduce contact with viruses and bacteria.
- **Industry**: In industries, coatings provide protection to equipment such as pipelines from weathering, extreme heat/light, and corrosion; in membrane industry, coating is used for the selective separation of gases.
- ***Cosmetics***: Coating is widely used in creams, glasses, nail paints, etc.

• ***Energy***: In this sector, coatings act as a protective barrier against extreme heat and light, enable easy dust removal, serve as an O2 barrier, such as in wind energy and solar energy panels, and so on.

The use of coatings have increased extensively in automobile, aerospace, aircraft, marine, membranes, magnetic media, storage devices, and food industry. They are also used in the oil and gas industry for corrosion control, encapsulation of electronic circuits, textile industry for making breathable clothing, and surface engineering industry for manufacturing of multilayer coatings that are used in various transportation and infrastructure applications, implantable devices, and materials for protection from the weathering conditions.

Polymeric coatings are prepared with or without solvents. Coatings of one polymer and one solvent are called binary coatings. Multicomponent coatings have more than one polymer/solvent. Polymeric coating chemistry is different from that of polymers. The coating includes polymer matrix or binder: the polymer phase that holds all the constituents together. In polymeric coatings, we add fillers, pigments, surfactants, plasticizers, and binders to impart hardness/flexibility, strength, weather protection, color, gloss, and reflectance. The interface plays an important role in the performance of polymeric coatings. The main types of interfaces are substrate (bottom), coating air (top), and additives (internal). Other interfaces that also play a role are solid–gas, solid–liquid, and gas–liquid interfaces (e.g., in drying paints). Flow and leveling properties greatly influence the appearance and performance of coatings. The polymer phase present on the surface and its chemistry is far different from the bulk polymers. The interesting characteristics of polymer coatings are that they are easily spread and handled. They can be applied as liquids as in the case of paints, and various additives may be added to enhance their properties. Some other properties such as flexibility, drying, and self-healing are the ones where molecular mobility plays an important role. The advanced polymeric coatings are thermosetting in nature, despite that a large majority of polymeric materials are thermoplastics. It is easy to predict the molecular mobility of thermoplastic polymers because their entangled macromolecules are still largely independent. However, in thermosetting polymers, the network structure strongly hinders the molecular mobility.

Wether it concerns electricity poles, coils, gas canisters or drilling platforms, they all have to withstand the elements or frequent handling. This requires metal coatings with exceptional performance and Stahl delivers just that. Our polymer technologies protect metal products and outdoor constructions against damage and corrosion, while meeting safety standards and regulation.

Anti-Corrosive, Resistant and Safe Coating Technologies

One of the main challenges for metal surfaces is preventing corrosion. Stahl Polymers provides resins that are alkylphenol epoxylates (APEO)-free. This enables alternative solutions that protect metal products and constructions from the oxidizing effects of water and humidity. This ensures their long-time high-performance functionality. At the same time, metal or metal-coated products face a lot of heavy-duty handling. Think of gas canisters or bottles or industrial drums, which require a hard, scratch-resistant coating. Water-based acrylic polymers are a vital component of chemical resistance properties required for industrial coatings that also retains their flexibility. We even design polymeric solutions that withstand the extreme conditions of a marine environment. Thanks to the versatility in polymer technologies we offer, compatibility and easy formulating, we can provide resin solutions with excellent results. Resins that offer

protection for metal surfaces with high gloss, high scratch and abrasion resistance, with high flexibility and extremely high chemical resistance.

Working With Stahl as Partner for Metal Coating Solutions

Stahl's expertise in responsible chemistry has helped us become a rapid market leader in the field of metal coatings with a portfolio of acrylics and polyurethanes that are leading in performance. Additionally, we provide direct technical service to even our small-scale clients as we value each equally and understand their pressing needs for the right fit technologies. With first class resins, we can help formulate coatings that create hard surfaces with resistant film that leaves no cracks and holes, ensuring durable and long-term protection. As we produce locally, we can also provide fast services.

Key Benefits of Stahl's Metal Solutions

There are numerous advantages to opting for Stahl Polymers when it comes to resins for metal surfaces. In addition, we can create solutions tailored to your precise needs in performance and legislative requirements.

Key benefits:

- Excellent adhesion on metal
- Very good corrosion resistance
- Solvent-free and low VOC
- High hardness
- Excellent chemical resistances
- From high gloss to satin/matt formulations

Metal solutions portfolio overview

Description	Solids (%)	MFFT (°C)	Features benefits and uses
Styrene-acrylic emulsion	40.0	50	Outstanding corrosion and blister resistance.
Styrene-acrylic emulsion, OH functional	47.5	37	For oven bake systems with melamine. Outstanding hardness and chemical resistance on metal surfaces. High gloss properties.
Styrine-acrylic emulsion	50.0	32	Outstanding corrosion and blister resistance. Direct to metal (DTM) coatings.
Solvent-free aliphatic polycarbonate PUD.	35.0	74	For use in metal pre-treatment and fingerprint coatings. Excellent heat and corrosion resistance.
Solvent-free aliphatic cationic polycarbonate PUD	35.0	50	For use in metal pre-treatment. Excellent stability at low pH. High hardness.

CONCLUSION

In conclusion, it should be noted that the speed and quality of production will increase as the manufacturing industry improves polymeric materials that replace natural materials and metals. films and fibers are used in all fields of machinery. This article describes the methods of production and modification of films and fibers using modern methods, as well as coating the detail surface with polymer coatings.

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EFFECT OF TOXIC ANEMIA ON ERYTHROCYTE AND HEMOGLOBIN LEVELS DURING GESTATION AND LACTATION

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ABSTRACT

It was shown mother's toxic anemia during gestation and lactation resulted in decreasing of number of erythrocytes and hemoglobin contents in fetus and offspring. The effect of mother's anemia more expressed during lactation than during lactation. The administration of drugs that cause toxic anemia in pregnant and lactating rats during the reproductive cycle causes significant changes in red blood cell counts in the mother and offspring. These changes were manifested in a decrease in the number of erythrocytes and the amount of hemoglobin relative to the control in rats in the experimental group. The effect of phenylhydrazine anemia on blood counts in the maternal-hereditary system was more pronounced than that of lead acetate anemia.

KEYWORDS: *Rats, Toxic Anemia, Erythrocytes, Hemoglobin, Phenylhydrazine Hydrochloride, Lead Acetate.*

INTRODUCTION

Due to the industrialization of industry and agriculture, there is an increasing number of various substances in the environment that have a negative impact on the body, including heavy metal salts, phenolic derivatives, mineral fertilizers and other toxicants. Most of these toxic substances enter the blood circulation through the protective barriers in the body through drinking water, food, respiratory organs and skin [3, pp. 182-192; 8, pp. 48-53]. The effects of certain xenobiotics (e.g., lead ions, phenylhydrazine, etc.) on the cardiovascular, digestive, renal, nervous, blood and other systems have been shown to be dangerous for both mother and child, especially in the first trimester [9, pp. 383-395]. It has been shown that the effects of phenylhydrazine [1, p. 23] and lead ions [4, p. 23] on blood counts depend on the concentration of harmful substances.

THE MAIN FINDINGS AND RESULTS

Escribano (1997) showed that in megacities, the human body receives 140 mg / kg of lead ions per day, which has its effect. Gurber (1997) noted that in industrial regions, up to 1000 mg / kg of lead ions can pass into the human body overnight.

Many toxicants trigger the formation of active radicals by disrupting calcium homeostasis in the cell by disrupting energy metabolism. It is these radicals that cause the breakdown of cell membranes by altering the processes of protein synthesis and division in the cell, the structure of membranes [2, pp. 32-34; 6, p. 203].

The effects of lead, phenylhydrazine, and other anemic pollutants have been shown to be associated with hemolysis of erythrocytes, impaired heme synthesis, and changes in hematologic classification today [6, p. 206].

Although the effects of lead ions and phenylhydrazine on blood classification have been shown [1, p. 23; 10, pp. 396-402], these hemolytic toxins have not been seen simultaneously at different stages of the reproductive cycle in the mother and offspring. There is also no general information on the classification of red blood cell changes in mother and offspring.

The Purpose of the Work

To study the effect of certain ecotoxicants (lead acetate and phenylhydrazine hydrochloride) on the state of erythrocytes in the mother and offspring during gestation and lactation, which affect blood parameters?

MATERIALS AND METHODS

The experiments were carried out on pedigree rats and growing rats bred in the vivarium of the National University of Uzbekistan. Rats were divided into two experimental and one control groups. In rats in the experimental group, 2 different toxicants (organic and inorganic substances) were used to induce hemolytic anemia.

The first experiment used an organic compound - phenylhydrazine hydrochloride as a hemolytic poison for rats in the group. Phenylhydrazine hydrochloride was administered at 14 days of gestation (80 mg / kg) to induce toxic anemia in pregnant rats, [7, p. 200] and to induce anemia during lactation, the drug was administered to mothers at the same dose on day 3 of lactation.

In experimental rats in the second group, the mother was given 0.01% lead acetate solution instead of drinking water during the third trimester of gestation, as well as throughout lactation, to induce lead acetate anemia.

Biochemical analyzes were performed in mothers and fetuses on the 21st day of gestation, and on the mother and offspring during lactation - on the 12th day of postnatal life. That is, blood counts were determined in both mother and offspring at the same time.

The amount of hemoglobin in the blood (g / l) and the number of erythrocytes (T / l) were determined by general clinical methods [5].

The results were analyzed by Student using the Excel program. Statistical reliability was assessed on the basis of R and t indicators. When R <was less than 0.05, the results were considered statistically reliable.

RESULTS AND DISCUSSIONS

The results showed that during gestation and lactation there were significant changes in toxic anemia of mother rats and red blood counts in their offspring (Table 1, 2).

TABLE 1 CHANGES IN BLOOD COUNTS OF MOTHER RATS DURING GESTATION AND LACTATION UNDER THE INFLUENCE OF TOXIC ANEMIA (M ± M; N = 6)

Animal group	Gestation (21 days)		Lactation (12 days)	
	Hemoglobin (g / l)	Erythrocyte (T / l)	Hemoglobin (g / l)	Erythrocyte (T / l)
Control	148,3±3,1	9,8±0,31	148,3±3,1	9,83±0,31
Experiment1	93,3±3,3	6,00±0,37	91,7±3,1	5,67±0,33
R	<0,001	<0,001	<0,001	<0,001
Experiment2	98,3±4,8	6,50±0,43	95,0±4,3	6,17±0,48
R	<0,001	<0,001	<0,001	<0,001

In maternal rats administered organic hemolytic substance, phenylhydrazine hydrochloride, hemoglobin content decreased by 37.0% and 38.1%, respectively, and erythrocyte count decreased by 39% and 42.3%, respectively, during gestation and lactation. When inorganic toxicant, i.e. lead acetate, was used, the amount of hemoglobin in pregnant rats decreased by 33.7% and the number of erythrocytes by 33.7%. In mammals, hemoglobin decreased by 35.9% and erythrocytes by 37.2%.

In the next phase of our study, we also identified red blood cell counts in offspring born to a mother rat with toxic anemia.

TABLE 2 CHANGES IN THE AMOUNT OF HEMOGLOBIN AND ERYTHROCYTES IN THE FETUS AND OFFSPRING OF MATERNAL TOXIC ANEMIA DURING GESTATION AND LACTATION (M ± M; N = 6)

Animal group	Fetus (21 days)		Generation (12 days)	
	Hemoglobin (g / l)	Erythrocyte (T / l)	Hemoglobin (g / l)	Erythrocyte (T / l)
Control	86,7±6,7	2,7±0,3	106,7±6,7	3,7±0,33
Experiment1	65,0±5,6	2,75±0,2	86,7±4,2	2,4±0,20
R	<0,05	>0,5	<0,05	<0,02
Experiment2	73,3±4,2	2,3±0,2	95,0±3,4	2,83±0,31
R	>0,10	>0,1	>0,10	>0,10

The table shows that the amount of hemoglobin in the fetus in mothers anemic using phenylhydrazine hydrochloride decreased by 25.0%, and the number of erythrocytes remained at a control level. When the same type of anemia was introduced in lactating mother rats, the amount of hemoglobin decreased by 18.7% and the number of erythrocytes by 35.1%.

When a rat is given a solution of lead acetate instead of drinking water, and the amount of hemoglobin and erythrocytes in the fetus decreases, this decrease is not statistically significant. Even during lactation, a drop in lead acetate in drinking water did not have a significant effect on red blood cell counts in the offspring, i.e., 12-day-old rats.

Thus, according to the data obtained, there is a shift in red blood cell counts under the influence of some toxicants in the environment, the concentration of which is above normal, in particular phenylhydrazine and lead acetate. The administration of anemic agents to pregnant and lactating rats during the reproductive cycle causes significant changes in red blood cell counts not only in mothers but also in offspring. These changes were manifested in our experimental observations in the reduction of red blood cells and hemoglobin in the offspring of mothers with hemolytic anemia during gestation and lactation.

It should be noted that regardless of the nature (organic or inorganic) of the reagent that causes toxic anemia in the mother, the amount of red blood cells and erythrocytes in the fetus is reduced. During lactation, the effect of phenylhydrazine was more pronounced than that of lead acetate salt.

It has been noted that mothers with iron-related anemia are more likely to have anemia in their offspring [6, p. 203]. This means that the toxicants that cause hemolytic anemia in the mother cause negative shifts in the red blood cells in the child as well as in the whole organism. This is due to the fact that changes in hematological parameters, changes in the respiratory, nutritive, protective and other functions of the blood and are reflected in the functional systems of the whole organism [9, pp. 383-395].

Therefore, it is expedient to improve measures to reduce the impact of ecotoxicants on the population in environmentally polluted areas, especially in women of the reproductive cycle.

CONCLUSIONS

1. When phenylhydrazine hydrochloride and lead acetate are administered to mother rats during gestation and lactation, the amount of hemoglobin and erythrocytes decreases.

2. Experimental toxic anemia in the mother during gestation and lactation leads to negative shifts in red blood cell counts in the offspring.

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THE NEED OF THE METAL FOR THE STUDY OF SOCIAL STRATIFICATION

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ABSTRACT

One of the most widely studied topics in mortuary archaeology is the connection between an individual's social standing and the presence of metal grave goods. Our research raises questions regarding the existence of other societal status indicators, which may also be important bearers of social data. The participants in this research were individuals from the Wicina cremation cemetery (n = 355) who died between the late Bronze Age and early Iron Age and whose age at death was determined. The existence of wood grave chambers (GCh) as well as the base number of vessels (MNV) per burial were regarded as social separation mediators. Tests were completed to see whether these grave lists distinguished the probability of survival of individuals of different ages, and to identify the lists that had the most predictive power with regard to death age. The social division was mirrored in the probability of endurance: individuals who lived with a higher social stratum had a greater chance of surviving for a longer period of time, and vice versa. The presence of metal objects has no effect on the probability of endurance, according to our findings.

KEY WORD: *Bronze, Iron, Metals, Stratification.*

INTRODUCTION

Urn fields spanned a large area of Focal and Western Europe throughout the Bronze Age and Iron Age, and suffered from the fourteenth century BC onwards. In light of archeological evidence obtained from Central Europe, it was discovered that the majority of urn field societies share at least three primary characteristics: the predominance of incineration, a significant increase in the number of both graves and large graveyards, and the consolidation of earthenware production in funerary customs [1].

Before the urnfield era, none of these features were abundant in the archeological record. During this time, several jars filled with human cremains became a popular symbol of the end of the Bronze Age and the beginning of the Iron Age in various parts of Europe. Perhaps the most researched study areas in antiquarianism are studies on the observable evidence of possible social demarcation based on grave developments and grave goods. However, the unthinking application of some basic concepts, such as prestige, glory, and social position, has also been highlighted [2].

The meaning of ‘renown things,' which were made of crude materials that were significant as well as uncommon (as determined by contemporary judgment), introduced complex structures, and at times exemplified advancements regarding their material, methods of assembly, and so on, from which they inferred the majority of their dowry, was primarily focused on the funerary setting[3].

(They are usually presented in archeological literature in opposition (whether absolutely or definitely) to items of private use that are simple, pragmatic, and less ornamented (. Studies on social division in the Bronze Age are typically based on the evaluation of metal items, such as their quantity, quality, and variety of structure and material – for example, gold versus copper (for stores, see Duty, 1979), and the comparison of these factors to anthropological data obtained from entombments. For a long time, a typical inspection technique has been searching for markers of 'luxuriously' and 'inadequately' equipped graves and then comparing the results with the sex and age (two words regarded as natural classes) of the deceased. Ceramics, in contrast to metals, have seldom been thought of as a social status symbol [4]. Fig 1 shows the Open villages (black), fortified settlements (green), and cemeteries (blue) at Wicina; the presenting site is indicated with a yellow arrow

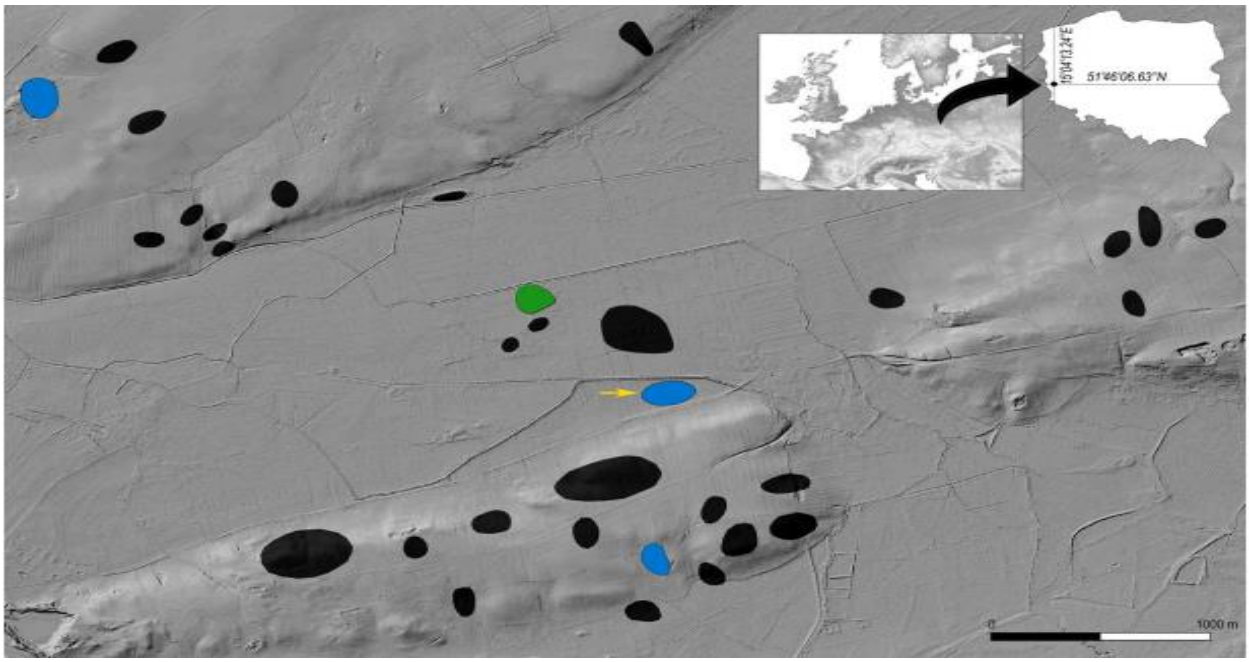

Fig 1: Open villages (black), fortified settlements (green), and cemeteries (blue) at Wicina; the presenting site is indicated with a yellow arrow.

The Wicina Burial Ground is located in a densely populated small area with a number of archeological sites dating from the Late Bronze and Early Iron Ages. The location's point of

confluence is a well-known long-term settlement in the Lussa stream's broad basin, which was discovered for the first time in the 1920s. The site covers about 22,000 m2 and is clearly visible in the landscape, with the tallest of its bulwarks reaching a height of 4 m [5].

Furthermore, it is constantly flooded, allowing the discovery of wonderfully protected, gigantic wooden constructions that may be accurately dated to between the ninth and sixth hundreds of years BC using dendrochronological methods. However, certain timber components dating from the tenth or ninth centuries BC have been discovered to be reused materials from a more seasoned habitation at the same location. The settlement was suddenly destroyed by the Scythians sometime after 571 BC, as shown by Scythian weapons, layers of devoured structures, and human remains, mostly of women and children [6].

From 1965 through 1978, extraordinary hands-on effort, involving surface investigations, exploratory channels, and ordinary unearthings, revealed the last remnants of open communities, burial sites, and metal-storage areas. The urnfield, which included 502 burials and 574 entombments, was the cemetery of a neighborhood local area that lived first in the open settlement and then in the maintained settlement.

The term "social stratification" refers to a system in which a community assigns a hierarchy to families of individuals. In the United States, it is undeniable that certain groups have more prestige, power, and money than others. Social stratification is the consequence of these disparities. The classification of individuals into socioeconomic strata in a society is based on their profession and income, wealth and social position, or derived power. The Figure 2 shows the various components of the social stratification.

Figure 2: The Various Components of the Social Stratification.

After the town collapsed, the area was desolate, indicating that the cemetery was not used after the Scythian attack. Archeological excavations covered approximately half of the area in the 1970s, but surface surveys revealed additional burial sites[7]. Because of the significant variation in the quantity of vessels present in the graves, the existence of lumber developments, and the immaterial use of polished metal objects as burial commerce, the unearthing's revealed interesting data regarding entombment traditions observed during the use of the cemetery [8]. Fig

3 shows the estimated probability of survival according to MNV[9].Fig 2 shows the estimated probability of survival according to MNV.

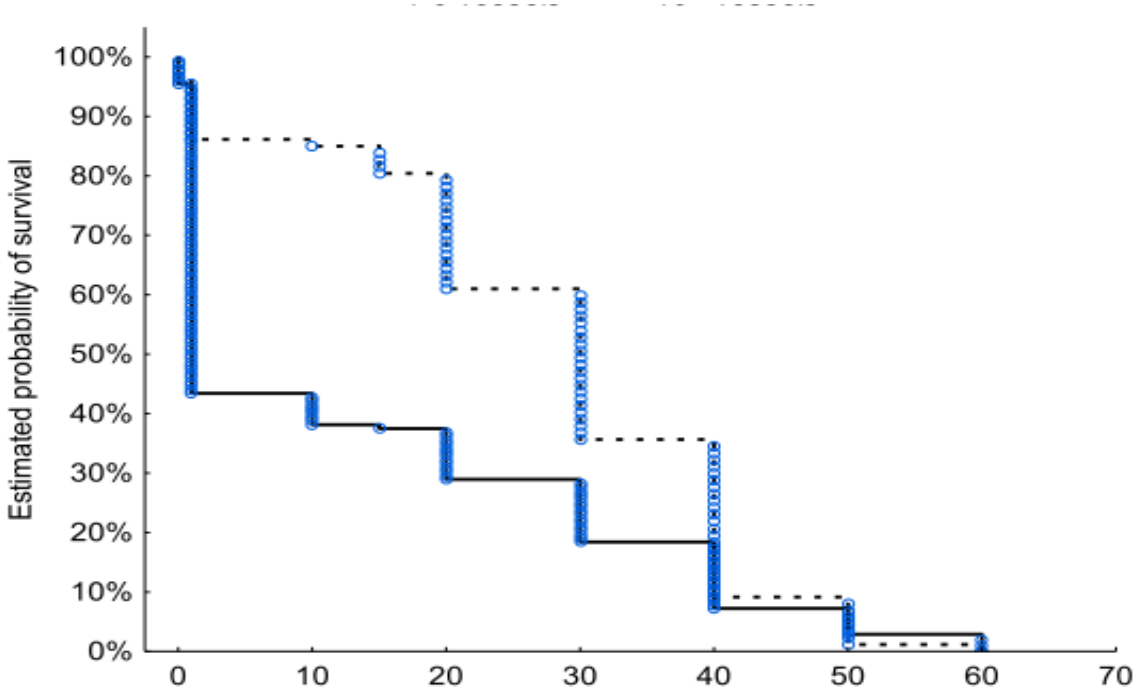

Fig 3: Estimated probability of survival according to MNV

DISCUSSION

Surprisingly few studies from the urn field period integrate natural and archeological data, and they attest to the ongoing quest for recurring instances in the selection of appropriate graves, such as material indications or the deceased's sex and age. On the other hand, research on the connection between social status and wellbeing in ancient populations is inconsistent and produces conflicting findings. Higher-ranking groups (also known as privileged societies, elites, or aristocrats) were taller, better-fed, and better-cared-for in ancient times, according to a few studies, and therefore lived longer than their less fortunate counterparts. The skeletal remains of individuals from higher and lower social positions did not differ much, according to several researchers. In a case study from Pontecagnano, Robb et al. examined the link between skeletal diseases and grave goods. Their findings suggested that the link between people's health, mobility, and social status as shown in grave goods was unexpected, and that, although the study focused on a divided society, the upper and lower classes may have faced similar health risks. Wilkinson and Norelli sought to evaluate the natural and social relationship between the instances in their study on the skeletal remains of high- and low-status individuals from the Monte Alban site in Oaxaca, Mexico. The lack of a significant difference between these two meetings in terms of sex proportions, measurement, and nonmetric variables suggested that they were not entirely unique in terms of natural status records. By contrast, it seems that societal inequalities were represented in the pointers of wellness crafted by Peck on two Center Iron Age burial sites in East Yorkshire, Northern England.

During the Bronze and Iron Ages, urn fields covered a vast region of Focal and Western Europe, and deteriorated from the thirteenth century BC onwards. The majority of urn field societies

share at least three primary characteristics, according to archeological evidence from Central Europe: the predominance of incineration, a significant increase in the number of both graves and large graveyards, and the consolidation of earthenware production in funerary customs.

A system in which a society assigns a hierarchy to families of people is referred to as "social stratification." Certain groups in the United States have undeniably more status, influence, and money than others. These inequalities have resulted in social stratification. Individuals in a society are classified into socioeconomic strata based on their occupation and income, wealth and social status, or derived power.

None of these characteristics were common in the archeological record prior to the urnfield period. Several jars containing human cremains were famous symbols of the end of the Bronze Age and the start of the Iron Age in different regions of Europe at this period. Studies on visible evidence of potential class demarcation based on cemetery changes and burial goods are among the most studied subject topics in antiquarianism. However, the haphazard use of certain fundamental notions such as prestige, grandeur, and social status has been emphasized.

The meaning of ‘renown things,' which were made of crude materials that were both significant and uncommon (according to contemporary judgment), introduced complex structures, and at times exemplified advancements regarding their material, methods of assembly, and so on, from which they inferred the majority of their dowry, was primarily focused on the funerary setting.

They are typically portrayed in archeological literature in contrast (whether explicitly or implicitly) to basic, pragmatic, and less decorated objects of private usage (. The evaluation of metal items, such as their quantity, quality, and variety of structure and material – for example, gold versus copper, and the comparison of these factors to anthropological data obtained from entombments, are typically used in studies on social division in the Bronze Age. For a long time, a standard inspection procedure has been to look for markers of 'luxuriously' and 'inadequately' furnished graves, then compare the findings to the deceased's sex and age (two natural groups). Ceramics, in contrast to metals, have seldom been thought of as a social status symbol

CONCLUSION

In the pale history of the Late Bronze Age and the early Iron Age, the principle center has been around tip top graves (for example Schumann and Van der VaartVerschoof, 2017), which were tremendous and richly outfitted with extraordinary items, however moderately not many when contrasted with the huge number of comparable, unobtrusive graves found in huge pieces of Europe. We demonstrated that these graves have research potential and ought not to be viewed as it were as an immaterial foundation to the examinations on ancient networks. Our exploration demonstrated that straightforward archeological and anthropological information created by the exhuming of a generally non-breathtaking graveyard can be a helpful logical device to contemplate the chance of social separation that is communicated in manners other than the presence of modern metal items. The urn field networks are regularly viewed as libertarian because of the presence of thousands of comparative graves (particularly before the rise of the strengthened settlements between the ninth and eighth hundreds of years BC), which appears to be far-fetched as the battle for power and different sorts of social rivalry is a natural trait of generally over a significant time span social orders. The Wichita locale, with its huge braced settlement situated in the wetland and encompassed by many open settlements and burial grounds are not an exemption. Taking into account certain interpretive alerts, it very well may be inferred that social definition in the little yet complex local area investigated through the

utilization of certain grave records could be reflected in the likelihood of endurance and the age at death.

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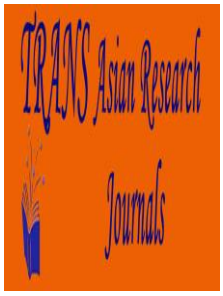

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WIRELESS MESH NETWORKING: A KEY SOLUTION FOR EMERGENCY & RURAL APPLICATIONS

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ABSTRACT

Safety, catastrophes, and emergency circumstances will be faced by all communities, whether rural or urban. In these circumstances, communication systems are put under extra strain to ensure that they are completely functional. Given the present state of Public Safety and Disaster Recovery, dependable wireless mobile communications that allow real-time information sharing, continuous availability, and interagency interoperability are critical in an emergency. Wireless Mesh Networks have gotten a lot of press recently as a broadband access option for a variety of industries, including metro, emergency, public-safety, carrier-access, and residential. This article discusses the technological needs for emergency and public-safety communications systems, as well as some of the technical implications of wireless mesh networks. The Man-portable, Interoperable, Tactical Operations Center communication system, which was sponsored by the US Department of Homeland Security, is described in this article. It's a cutting-edge mobile communications network that's ideal for public safety and disaster recovery.

KEYWORDS: *Architecture, Emergency Communications, Disaster Recovery, Public Services, Wireless Mobile Communications.*

1. INTRODUCTION

Disasters of unprecedented scale have lately struck the globe, claiming hundreds of thousands of lives, destroying millions of homes and businesses, and completely destroying vital infrastructure. Personnel are sent to the field in the event of an emergency, such as a chemical spill, storm, or other natural or man-made catastrophe, to assess the situation, prepare a reaction, and execute and monitor that response. Depending on the size and type of each catastrophe, emergency preparation and response/recovery methods differ from one event to the next. The interoperability, coverage, and adaptability of first responder communication systems are among

the most pressing concerns raised by such incidents. Current and future broadband multimedia public safety applications need a network solution that can provide high-speed, high-throughput, low latency, and high resilience over an entire access area, which may include several jurisdictions. Communication systems for crisis management and disaster recovery must be very dependable and resilient, as well as capable of operating in potentially hostile situations. The Department of Homeland Security's SAFECOM program has released a Statement of Requirements (SoR) for public safety wireless communication [1].

The following is a summary of the most significant functional criteria for public safety communication that the SoR study mentions, Support for Mobility Integration of voice and data connections across local, regional, and national organizations

1.1. Standards Design

Wherever feasible, use commercially available equipment Support for Unicast, multicast, and broadcast communication Security (Privacy, Integrity, and Access Control) On-the-spot access to response guidelines and the current condition of local assets

- Ability to modify, update, and manage field-generated material
- real-time data sharing for cross-jurisdictional and cross-agency cooperation
- Extensibility and Scalability
- Access to ugliness and assistance

Only a few towns in the United States have accomplished more than one or two of these technology-based characteristics in reality, particularly at the on-scene incident command level. There is concrete evidence of deployment-ready, integrated, cheap, and multifunctional technologies to assist emergency management and crisis response only in large cities like New York and Los Angeles. Typically, one or more of these information technologies are accessible at a permanent Emergency Operations Center (EOC) in a major city or in extremely big, costly, road-bound command posts the size of a tractor-trailer or recreation vehicle (RV). Mobile command posts are usually best suited for national agencies and the military[2], but small urban and rural towns in the United States are unlikely to have any capabilities beyond the conventional call and dispatch centers for law enforcement, fire, rescue, and ambulance services.

The PSDR communication solutions that are currently available lack critical functionality. They are very vulnerable since they depend on a fixed infrastructure and lack self-organization skills, and they do not support multimedia applications that need high-quality connections and/or large amounts of bandwidth. The traditional disaster relief communication system is mainly based on Terrestrial Trunked Radio (TETRA), which is intended for voice and status messages and has data speeds ranging from 2.4 to 7.2 kbps [2]. These data rate limitations are inadequate to provide firefighters with access to a building's structural information or to transmit video footage. While these restrictions have been eased with the introduction of TETRA-II, the fact that TETRA is based on a fixed network architecture of base stations makes it vulnerable to large-scale catastrophes. The federal government is investing billions of dollars in this field, and several states have either adopted or are in the process of implementing state-wide public safety communications networks. The conceptual vision of the national public safety communications network has made some development[3].

This article provides a review of current wireless technologies as well as their PSDR application possibilities. The PSDR communications requirements are discussed, and we demonstrate that wireless mesh networking technology is a reliable network for emergency and public safety situations[4]. The article then goes on to explain the MITOC's capabilities and design, which were sponsored by the US Department of Homeland Security for disaster management and crisis response.

1.2. Communications Systems for Public Safety and Disaster Recovery

Wireless communication is undeniably a popular service, as shown by the explosive development of cellular and wireless local area networks (WLANs), particularly those that adhere to the IEEE 802.11 family of protocols, often referred to as Wi-Fi. However, these two fundamentally different methods handle just a limited range of connection requirements, and wireless connectivity may help a wide variety of additional applications. Current cellular networks, including third-generation (3G) cellular networks such as Enhanced Data for GSM Evolution (EDGE) and Universal Mobile telecommunication systems (UMTS), provide wide-area coverage, but at a higher cost and with lower data rates than WLANs 802.11 a, b, and g[5].

WLANs, on the other hand, have a relatively small coverage area and mobility. A cable backbone linking numerous access points is also needed to expand the coverage regions of WLANs by adding additional access points. WMANs (for example, the IEEE 802.16 family of protocols) help to bridge this gap by providing high data rates and assured quality of service to a potentially vast client base (up to tens of kilometers from the base station) [6]. The major disadvantage of WMANs is their (present) lack of mobility support and the need for a clear line of sight (LOS) to the WMAN base station: customers who do not have a clear LOS to the WMAN base station are unlikely to get service. Because of the LOS requirement, more than half of the clients in areas with a high density of obstacles (high-rise buildings or trees) cannot be serviced. Furthermore, base stations are often complicated and costly. Wireless communications nowadays include a wide range of networks, devices, and formats[7].

Wireless communications, which evolved from analog and digital radio, may now offer users with a smooth, integrated means for high-speed wireless transfer of voice, data, video, and more. Designing a system that meets all of the PDSR criteria is very difficult. The communication infrastructure must be dependable and constant, and it must, if required, work with the devices of current responders' organizations[8]. New high-speed wireless networks are now available that are up to 1000 times faster than the majority of wireless systems presently utilized in PSDR applications. The systems listed below are examples of wireless technology solutions with public service and application possibilities.

1.3. Satellite Communications Systems

Satellite communication has been suggested and researched for application in catastrophes and public safety situations for high-speed data transfer and video conferencing [9]. Satellite IP network services utilizing very small aperture terminals (VSAT) have grown popular in mostly rural regions as satellite communication technology has advanced. VSAT has been investigated as a means of delivering interactive real-time data for applications such as telemedicine. However, VSAT satellite network connection services have a number of significant drawbacks, including unequal transmission rates, the weight of VSAT equipment, and the fact that VSAT is not permitted to be used for PDSR in at least one nation, and perhaps more.

1.4. WMN

A mesh network is a local area network that uses either a full mesh or partial mesh connection architecture. Each computer equipment in a complete mesh network is linked directly to each other, allowing the LAN to be supported by numerous connection tunnels. Some devices in a partial mesh network are connected to all others, while others are only connected to the devices with whom they share the most data[6]. The mesh network is especially well suited for municipal government services that are typically delivered in the field, such as public health and safety operations and disaster response, because it automatically determines the best access path for each device and adjusts on the fly for failed connections. In the event of a catastrophe, a complete mesh network offers the best chance of maintaining operations. It provides the most redundant connection points to a building or distant user, allowing data packets to be routed via alternative paths if one or more connection points fail[10].

2. DISCUSSION

2.1. Wireless "Bubble" from MITOC

The ability to offer a "bubble" of protected wireless Internet access is a key feature of MITOC. Authorized users may access all MITOC programs through this wireless network using wireless enabled PCs, laptops, or PDAs. This enables for on-the-spot cooperation through instant messaging, which helps to reduce radio traffic. For the wireless network, early MITOC versions utilized a Cisco 2.4 GHz broadband wireless router. The wireless technology is used in current versions for improved security, range, and coverage flexibility. Small, robust, battery-powered access points are used in this system, which may be dispersed across an emergency situation. Because employees had to operate within a few hundred meters of the MITOC electronic equipment suite, the original operating concept and technology restricted the usage of the MITOC wireless bubble. While this offered a considerable capacity, it could not assist responders operating at the immediate site of the incident in the case of dangerous circumstances such as fires or chemical spills. The idea of mesh wireless networking and its widespread adoption have drastically altered the scenario. A key new feature is the capacity for an incident commander in a command post and a responder working in the local vicinity of a danger to share a network-enabled, shared operational picture. The novel idea and technology enables video surveillance data, sensor data, text messaging, Internet access, and other operational information to be shared via common wireless mesh network architecture, in addition to conventional voice communications.

2.2. Operational Scenario Example

MITOC systems have been used to support and deploy a variety of real-world missions, including security operations at the Kentucky Derby and a large-scale train accident with a hazardous spill and fire, with up to six Breadcrumbs deployed to expand the MITOC wireless bubble. A railway accident and hazardous material leak would be the starting point for a conventional deployment of MITOC and the WMN. Our research team is summoned to assist and react to the operation. The incident command post will be positioned upwind a mile or more from the event in a hazardous hazmat scenario, with intervening terrain or buildings to protect the command post from any fire or explosion hazards.

MITOC offers the responders with a complete range of global voice and data communications at the command post in the event that power and communications are interrupted or unavailable.

Hazardous materials team personnel in full protective gear will go to the incident site from the command post, turning on and dropping off Breadcrumbs along the way. The team members will interact with the command post through voice and text messages from the spill site, using the deployed Breadcrumbs. The incident commander at the command post will get vital data from the surveillance cameras and chemical sensors they install on the site through the Breadcrumbs. After identifying the nature of the spill, hazmat team members will use the Internet connection provided by the Breadcrumb WMN and MITOC to obtain instructions for neutralizing the spill on their PDAs and laptops without leaving the site.

2.3. System Manufacturing and Distribution

Twelve MITOC systems have been ordered, with eight having been built and delivered to date. The majority of the first MITOC orders came from state and municipal governments, as well as energy and utility corporations, who will utilize their MITOCs to assist continuity and service recovery activities. Research workers at Murray State University are presently assembling production MITOC devices. The research team provides system documentation, training, and support in addition to hardware customized to each customer's specifications. While there is currently no commercial manufacturing plant in place, a business partner focusing on sales and marketing has been formed. This commercial partner is anticipated to establish a manufacturing facility and take over training and support duties in the future.

3. CONCLUSION

All PSDR communications rely heavily on terrestrial communication infrastructure, including landline and cellular telephone, as well as infrastructure-based Land Mobile Radio (LMR). When catastrophe hits, having access to dependable communications is critical to disaster relief and recovery activities, because fast reaction means lives saved and negative economic consequences are minimized. The significance of communications networks, such as telecommunications, broadcast, cable, and satellite systems, becomes apparent during local, state, and national crises.

In the absence of current infrastructure, mobile mesh networking allows broadband wireless communications, making it suitable for first-responder scenarios. In large-scale crises when tactical communications are best served by networking on the fly provided by a mesh network solution, it provides the interoperability, scalability, and dependable performance needed. There is no denying that wireless mesh has obstacles. The difficulties are mostly specific to WMNs, and more study has to be done before they can achieve their full potential. The wireless communications industry's potential and achievements, on the other hand, greatly exceed the difficulties.

For an emergency incident commander, MITOC offers a highly competent, field-tested, and cost-effective mobile operations center. Our study is only getting started on the difficulties and possible advantages of using wireless mesh networking to expand the MITOC communications infrastructure from the incident command post to the actual site of the emergency or danger. Preliminary findings suggest that WMN is a technically sound yet cost-effective strategy with substantial potential payoffs. Our ongoing study is not aimed at proving the viability of current WMN methods or inventing new ones. Our study will be focused on identifying, documenting, and sharing the creative methods to emergency management and crisis response developed by first responders as a consequence of utilizing sophisticated information technology during training and real-world operations.

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MATHEMATICAL MODEL OF OPTIMAL DISTRIBUTION OF FREIGHT FLOWS IN THE REGION IN THE TRANSPORT NETWORK AND THEIR DEVELOPMENT

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ABSTRACT

The article presents the analysis of the development and problems of the transport sector and transport communications, new requirements to it in a growing economy.As well as the issues of posing challenges and the development of models of assimilating goods traffic in the best use of the means of automobile and rail transport and transport networks and their development taking into account the perspective growth of goods traffic, making analysis of the criteria for the optimal solution of transport network development.

KEYWORDS: *Transport, logistics, security, automobile, railway, network, multiset, development, road scheme, optimal, criterion, mathematical model, freight traffic.*

INTRODUCTION

The growth of the manufacturing sector in our country in promising areas of great practical and strategic importance, the rapid formation and launch of international joint ventures on the basis of foreign investment will increase the demand for transport. This requires the development of technical and technological capabilities of the transport system, and the various vehicles and industries to effectively meet the needs of consumers in the volume of traffic in a timely manner. The dynamics of the volume of freight traffic by types of transport over the years (Figure 1) is given *(Taken from the State Statistics Committee of the Republic of Uzbekistan).*

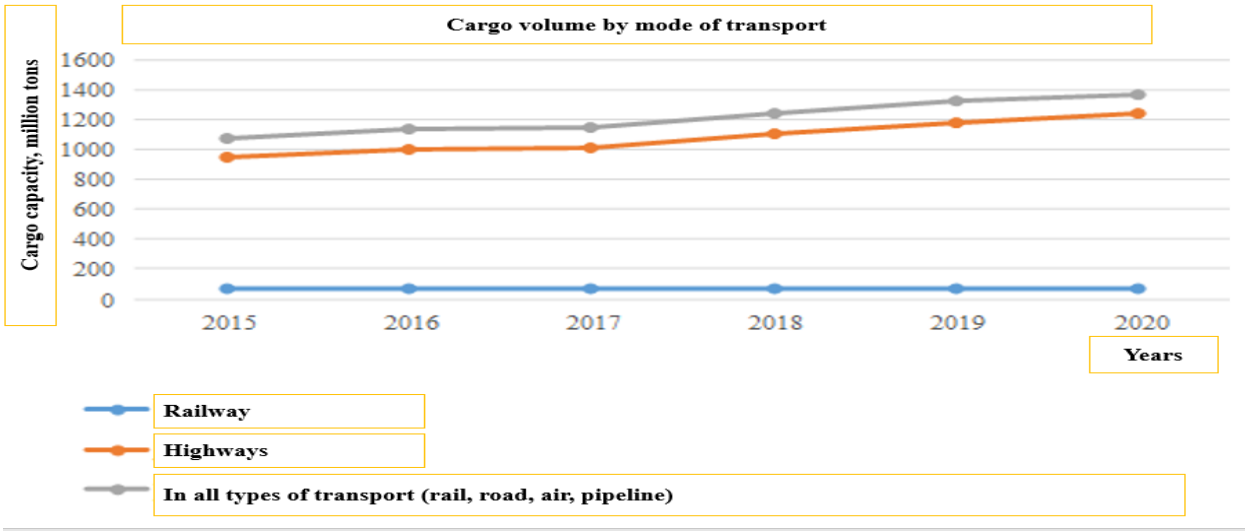

Figure 1. Changes in the volume of freight traffic by modes of transport over the years.

Figure 1. Changes in the volume of freight by type of transport over the years.

In order to optimize the delivery of future cargo flows to domestic and foreign markets and reduce their cost, it is necessary to develop the transport and logistics sector. One of the key factors in the development of transport and logistics is the level of demand for transport in the region, i.e. a well-developed economic infrastructure.

A highly developed and efficient transport system is seen as a key factor in creating logistics centers and attracting investment.

Improving the transport supply of the region, in turn, will create opportunities for the effective management of flows and minimization of transportation costs in the chain of multimodal transport in the region. To do this, it is necessary to develop a scientifically based methodology.

LITERATURE REVIEW

An analysis of the literature on multimodal cargo planning shows that researchers use three main levels in planning, namely strategic, tactical and operational levels, from which tactical level issues are studied extensively, followed by strategic and operational level issues (SteadieSeifi M., et al., 2014).

Forms of design of multimodal transport network and methodological bases of capacity are considered (Goncharuk S.M., et al., 2012).

Prospects for the construction of high-capacity roads in Europe, ways to increase transport capacity in Slovakia, reloading stations ("Construction of transport capacity in Slovakia, reloading stations") and reduce the time of freight traffic from Eastern Europe and Asia (Tchumlyakov KS, Tchumlyakova DV, 2015).

At present, multimodal transportation (Petraška, A., Palšaitis, R., 2012) is indicated as one of the main methods of delivery of oversized and heavy loads from the sender to the consumer.

The problems of planning multimodal transport routes have been studied in many studies, and most studies have focused on optimization in terms of cost, time, risk, and environmental

protection (Chang, T.-S., 2008; Sawadogo, M., Anciaux, D., Roy, D., 2012; Xiong, G., Wang, Y., 2014; Sun, Y., Lang, M., Wang, D., 2016; Dib, O., Moalic, L., Manier, M.-A., Caminada, A., 2017; Fazayeli, S., Eydi, A., Kamalabadi, IN, 2018).

Genetic algorithm in the planning of multimodal transport routes (Sun, Y., Lang, M., Wang, D., 2016; Dib, O., Moalic, L., Manier, M.-A., Caminada, A., 2017; Fazayeli, S., Eydi, A., Kamalabadi, IN, 2018), ant column algorithm (Sawadogo, M., Anciaux, D., Roy, D., 2012), hybrid algorithm (Kai, K., Haijiao, N), Yuejie, Z., Weicun, Z., 2009) and the short path algorithm (Idri, A., Oukarfi, M., Boulmakoul, A., Zeitouni, K., Masri, A., 2017), (MuratovA.Kh. 2021) are widely used.

The use of a short-distance algorithm (KSP) in the planning of multimodal transport routes is considered expedient and is effective in obtaining optimal solutions. The short path algorithm (KSP) has the advantage that it gets optimal and stable (stable) solutions.

For KSP algorithm, many scientists have conducted research in recent years to solve short path problems according to KSP algorithm (Eppstein, D., 1998; Yen, JY, 1971; Martins, EDQV, Pascoal, MMB, Santos, JLED, 1999; Aljazzar, H., Leue, S., 2011; Chen, BY, Li, Q., Lam, WHK, 2016; Liu, H., Jin, C., Yang, B., Zhou, A., 2018).

In solving the multi-route problem of multimodal transportation of long-distance and oversized loads, the transformation of the transport network to a vertical network, i.e. a multi-prism network, has led to a solution in the form of a Yen and J.Y. algorithm (Yen, J.Y., 1971) was improved (Yan Luo, at all, 2021).

It is known that research on short-distance multimodal transport is insufficient. This paper uses a multi-sectoral approach to solve the multimodal problem of multimodal transport, and the developed model aims to simultaneously determine the direction of transport by modes of transport, as well as the nodes and lines that are being reconstructed to reduce overall costs.

A general scheme for the formation of a multi-network of road, road and rail transport in Surkhandarya region has been developed, focusing on the optimal distribution of freight traffic in this network (Shermukhamedov A.A., Kuziev A.A., 2020).

Despite the great attention paid to the above-mentioned issues, there are many problems and issues that need to be addressed in this regard.

In particular, the main difficulties in the organization of multimodal transport are: first, the interaction of different modes of transport and the process of coordination of work, secondly, the legal relationship, and thirdly, the lack of permanent routes.

RESEARCH METHODOLOGY

In the course of the research work, a multi-sectoral method of delivering freight flows to consumers in the region was analyzed. Load flow optimization is implemented in an extended single terrestrial transport network. A single transport multinational network differs from a normal network in that it has several transport sections and additional (fictitious) nodes. Mathematical methods, multidisciplinary, graph theory and statistical analysis and other methods were used to cover the topic.

ANALYSIS AND DISCUSSION OF RESULTS

In the article, the optimization of freight flow is carried out in an extended transport multitask. The transport multidisciplinary differs from the ordinary network by the presence of several transport sections and additional (fictitious) nodes. It is created in the following order. The available points of each mode of transport (in terms of sending, receiving, economic and technical, capacity and other indicators) are shown as nodes of the graph.

Addresses where different modes of transport are connected, i.e. points where it is possible to reload from one mode of transport to another, are represented in the form of several addresses, respectively, which more fully takes into account the transport costs of door-to-door transmission (Figures 2 and 3).

The real point where the different modes of transport are connected is divided into B-sender, S-receiver conditional and neutral links 1,2,3. The oriented arc between the conditional links reflects the costs of the initial-final operation of the corresponding modes of transport, as well as the costs of reloading from one mode of transport to another.

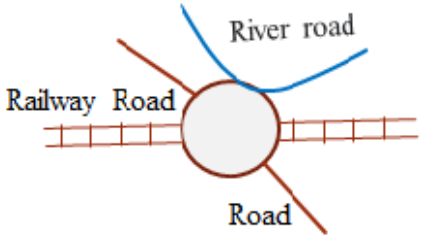

Figure 2. View of the transport network

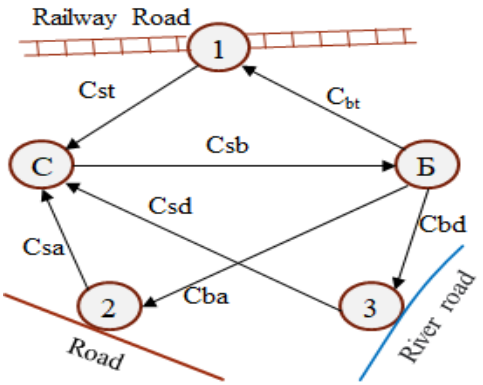

Figure 3. Multi-network view

Therefore, S_{BA} and S_{SA} - determine the cost of initial and final operations on road transport, S_{BT} and S_{ST} - railway, S_{BD} and S_{SD} - on river transport, and S_{SB} - indicate the additional costs of cargo storage (Figure 3). It will be possible to add other modes of transport (air) to the network.

We will introduce the basic concepts and indicators related to the transport network to address the issue and develop a model.

The basic concept of the road and rail transport network is the addresses (junctions) where the various road links (arc) meet. Such points we call connection addresses (TM). TMs are addresses where the consignor or consignee, the transmitter of goods from one mode of transport to another, intersects the links of railways or highways in different directions. The TMs of the network can also be the addresses of the sender, receiver or transmitter of goods from one mode of transport to another, which can be launched in the future.

To illuminate the issue, we enter the following definitions.

Sector	
N	set of nodes

S	shipper
t	receiver
S , $t \in N$	this set and a set of addresses S

Parametrs

$X_{ij,l}^{p}$	The parameter variable that characterizes the transport flow
ij	link (arc) connecting the transport network $\boldsymbol{i}$ address with j addresses
$\boldsymbol{i}$	$\boldsymbol{i}$ =1,2,…, n -shipper
j	j =1, 2, ..., m -freight receiver
l	the type of load associated with that current
p	the degree of development of the transport flow arc
a_i^l	the volume of cargo shipped from one address to each $\boldsymbol{i}$
b_j^l	the volume of cargo accepted for each j address
l	l=1,2,…, k -a set of indices indicating the type of load
$X_{ij,l}^{p}$	flow of transported goods
$D_{ij}^{p\max}$	ij the maximum possible number of vehicles crossing the road on average per day
$X_{ij,l}^{p} \cdot \frac{1}{Д_к \cdot q_{ij}^{p}} \cdot K_{ij}^{p}$	conversion of the traffic flow parameter to the maximum number of vehicles passing through section ij per day
q_{ij}^{p}	Average load capacity of vehicles passing through the section at the level of development of ij arc p , t
K_{ij}^{p} –	coefficient indicating the share of vehicles of other types, except trucks, in the traffic flow through the section
$Д_к$ –	number of calendar days
C_{ij}^{p}	indicator, i.e. the cost of transportation per unit volume

Now we move on to the analysis of the characteristics of the arc of the transport network in relation to the transmission of freight flows. In general, the problem of optimality can be taken as the sum of the product of the parameters C_{ij}^{p} and X_{ij}^{p} of the elements of transportation costs for all l type of cargo in all ij arc of the network. However, in this case, it is necessary to determine the composition of C_{ij}^{p} parameters differently, depending on what level of development of the transport network is considered for P. For example, if the problem is solved for an existing

network, P=0, then $C_{ij,l}^{p} = C_{ij,l}^{p(ж)}$. Where $C_{ij,l}^{p(ж)}$ is the cost of transportation at current costs per unit volume of traffic. Conversely, if $P > 0$ is then $C_{ij,l}^{p} = C_{ij,l}^{p(жк)}$, and $C_{ij,l}^{p(жк)}$ is the sum of current expenses and capital expenditures per unit volume of freight. Analytical expressions of the current and total cost formation of freight for different transport networks and operations are analyzed in detail in the following articles.

Another important issue in the formation of the mathematical model of the problem is to ensure that the optimization parameter $X_{ij,l}^{p}$, ij arc do not exceed the limiting value range determined for each arc of the transport network in accordance with its level of development. Such a constraint is represented by the appearance of different parameters for each type of transport. For example, the level of development for the road network is determined by road categories, and the ij road sections in each category are characterized by an average of $D_{ij}^{p\max}$ of the maximum possible number of vehicles crossing the road per day on average. To express this limitation in the model of the problem, it is necessary to change the parameter of the flow of freight from $X_{ij,l}^{p}$ to $D_{ij}^{p\max}$, the maximum possible number of vehicles passing through the ij -arc section per day. Such a transition can be made using the expression $X_{ij,l}^{p} \cdot \frac{1}{Д_{к} \cdot q_{ij}^{p}} \cdot K_{ij}^{p}$.

The volume limiting freight flows for railway transport arc is characterized by a maximum value of $Q_{ij}^{p\max}$ of the volume of traffic that this section can carry per day. Due to the differences in the limiting parameters for the load currents in the arc of different transport networks, it is necessary to divide the set of arc in the area IJ into local sets of arc for each mode of transport, ie local arc of $IJ_{AЙ}$ highway and $IJ_{TЙ}$ arc of railways.

Thus, the problem statement and the mathematical model are formed as follows: in the area of the economic zone, the given connection addresses are determined by the arc ij and the non-negative $X_{ij,l}$ load currents

$$X_{ij,l}^{p} \geq 0,\ ij \in IJ \text{ and} \qquad (1)$$

and in this case the intensity of traffic passing through the arches of all highways shall not exceed $D_{ij}^{p\max}$, the maximum capacity of this section of traffic flow.

$$\sum_{l=1}^{k} X_{ij,l}^{p} \cdot \frac{1}{Д_{к} \cdot q_{ij}^{p}} \cdot K_{ij}^{p} \leq D_{ij}^{p\max}, ij \in IJ_{AЙ}\ ; \qquad (2)$$

the flow of transport for all types of cargo transported on all sections of the railway network does not exceed the maximum capacity of the $Q_{ij}^{p\max}$ capacity of cargo passing through this section;

$$\sum_{l=1}^{k} X_{ij,l}^{p} \leq Q_{ij}^{p}\ ,\ ij \in IJ_{TЙ}\ ; \qquad (3)$$

the volume of currents sent from TM across all arcs is equal to the volume of currents received at the next address

$$\sum_i a_i = \sum_j b_j \begin{cases} i = 1,2,...,n; \\ j = 1,2,...m; \end{cases} \quad (4)$$

for each node i=1,2,…, n and l=1,2,…, k for each load;

$$\sum_j \sum_l X_{ij,l} - \sum_j \sum_l X_{ji,l} = \begin{cases} a_i, agap, i \in S; \\ 0, agap, i \notin S, t; \\ b_j, agap, i \in t. \end{cases} \quad (5)$$

The current $(F_Ж)$ or full (F_T) costs of transporting area freight flows are minimized

$$F_Ж = \sum_{ij} \sum_l C_{ij,l}^{p(Ж)} \cdot X_{ij,l} \to MIN; \quad (6)$$

$$F_T = \sum_{ij} \sum_l C_{ij,l}^{p(ЖК)} \cdot X_{ij,l} \to MIN. \quad (7)$$

This view (formulation) of the issues of optimal development of the transport network takes into account the various options for the expansion, reconstruction and reconstruction of existing links in the transport network. It is possible to add new sections to the network of different modes of transport. In general, any type of transport section can be accessed as a *ij* link model with a specific transportation cost. Only this cost should be determined based on.

CONCLUSION

The development of the transport network is mainly based on the transport condition of the roads, respectively. This will allow for the rational distribution of capital funds allocated for the development of the transport network of the region.

The use of the results of this study provides a great opportunity in planning and designing the future development of the freight network in transport. In our view, while addressing the issue of efficient distribution of flows in the transport network in the economic zone, it provides a clearer and more comprehensive justification for the development of the transport network in the region. This saves the transport costs of the productive forces considerably. This, in turn, will increase the competitiveness of our products and our economy as a whole.

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TECHNOLOGICAL APPROACH TO THE EDUCATIONAL PROCESS AS A FACTOR OF ACHIEVING EFFICIENCY

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ABSTRACT

The article describes the formation of new social relations in our society today, the integration of education into the world educational system, the development of democratization and development processes, the need to use innovative educational technologies in the educational process, as well as the need for a new approach, the need to acquire independent knowledge in the educational process, the problematic organization of education, in order for the majority of students to thoroughly master the knowledge given in education, it is necessary to introduce pedagogical technology, to organize all parts of education on the basis of technological approach, to teach young people deep and thorough thinking, to form the ability to obtain independent knowledge in the educational process, to base pedagogical technology on the technological approach, to, the situation that guarantees the expected results in achieving the set goals is interpreted as the organization of education on the basis of innovative technologies, the activation of students in education, the optimization of education based on the principles of technological approach.

KEYWORDS: *Student, Purpose, System, Technology, Approach, Education, Process, Content, Principle, Quality, Control, Result, Suggestion, Interest, Creativity, Formation.*

INTRODUCTION

Today, technological approaches to the educational process are being implemented on a global scale. At the same time with this process, significant changes are taking place in the theory and practice of the pedagogical educational process. The composition of approaches in education is changing and a different relationship, pedagogical mentalities are being established. The educational system is enriched by the ability to work with new information, focusing on the individualization of the educational program of the creative solution. An important component of

the educational – pedagogical process is the interaction between the student and the teacher, aimed at the individual. The role of Science in the organization of pedagogical technologies, equivalent to social knowledge, is increasing. The learning process is incredibly complex. The effectiveness of education depends on the activity of educators and students, the availability of educational means, organizational, scientific, methodological perfection of the educational process, the need for people with knowledge in society and other factors that have not yet been determined. Society demands that the effectiveness of education be high based on its socio-political, economic needs.

All the joints of education should be organized in such a way that it should teach young people a wide range of thinking, along with providing them with deep and thorough knowledge. The formation of the need for independent knowledge in the student in the educational process is a requirement of the present day. A number of methods of work were supported in pedagogical practice and research. Problematic organization of education, activation of students in education, cooperation pedagogy, justification of base words, optimization of education, etc.Passed from experience. But even if these pedagogical tools give an effective result in some teachers, it could not be included in the mass or educational system. The main essence of pedagogical technology is to provide students with interesting training and full mastering of knowledge. The thorough mastering of the knowledge given in education by the majority of students is the main goal of the introduction of pedagogical technology.

The peculiarity of the new relationship is that it differs from traditional education in that it does not prohibit the independence and educational activities of students, but rather the direction to the established goal, the organization of educational activities in cooperation, the conscious transfer of them to the activity, the acquisition of interest in the study of the basics of Science in students.

Main part

Education is a key factor in the reform of society and its transformation into a society more open to the outside world and oriented to new technologies and knowledge [9]. Increasing the effectiveness of modern didactics and educational components in education, scientific development and practical justification of new ideas and technologies are being switched to. In this situation, it is important to establish a link between different pedagogical systems and educational technologies, the aprobation of new forms of the state educational system in practice, the application of pedagogical systems of the past in the present tense.

Until the emergence of pedagogical technology, among other things, the rule of sufficiently effective design of the educational process within the framework of the educational system, in which complex devices and processes are studied, has not been developed. This gap is filled by pedagogical technology, leaving a wide space for the teacher's creative approach to the designed learning process. The peculiarity of pedagogical technology is that the unconditional achievement of educational goals is designed and carried out in the educational process. The technological approach is most pronounced not only on the surface, but also on the pair, which makes it possible to realize the planned result.

The purposefulness, the diagnostic examination of the results of the process, makes it possible to embody all aspects of the educational process in the period of its development. It basically includes the following [11]:

- Setting the objective of education;
- Transition from a specific goal to a specific goal;
- Consideration of attention to the indicators of demand mastering;
- Active participation in assignments and educational discussions to be performed in training sessions;
- Evaluation of the result.

The norm of the complete standardization of educational objectives can be as follows:

a) High but not absolute;

b) Definitely.

In the first case, due to the complexity of the goal, it does not allow it to be converted into a fully observable type of behavior, the period scan is not reproduced. In the second case, it is dealt with the reproductive type of Education, which is a convoluted process.

Ўқув жараёнининг барча босқичларида бутун тизимнинг асосий технологик жиҳати – ўқув жараёнининг сўнгги натижаларига йўналтирилганлигини кузатиш мумкин.

In general, the composition of pedagogical technology includes [15]:

- Development of identified learning objectives in education;
- Taxonomy of educational objectives;
- Converting the objectives of control assignments into teaching aids;
- Methods of achieving the goal;
- Evaluation of the educational objectives achieved.

The main directions of improvement of modern pedagogical technologies from the psychological and pedagogical point of view are expressed as follows [12]:

- The transition from memorization to the function of memorization, that is, the transition to the process of self-development, which requires the possibility of using what has been developed;
- Transition from student orientation to secondary education and individualized education programs;
- Transition from external motivation of motivation to internal spiritual regulation of motivation.

The main way to understand pedagogical technology is to focus on clearly defined goals, establish regular interaction with the educator. Interaction forms the basis of pedagogical technology and completely covers the educational process. The teacher sets himself the goal that the students should understand and master the content of the teaching material, acquire certain knowledge and learn to apply it in practice. In the event that there are clear means of knowing whether the pedagogical goal has been achieved or not, the teacher can make sure that his or her work is effective and that the techniques he or she chooses are purposeful or, conversely, ineffective.

The specific methods of setting goals by teachers according to M.V.Clarin's opinion [3] are as follows:

1. Set a goal based on the plan of the study material.

2. To determine the purpose through the activities of the teacher.

3. To set the educational goal of the student through internal processes and legislation of social, emotional, personal development.

The purpose of the study is to determine through the content of education, the activities of the teacher or student does not allow to have a clear impression of the expected results in education.

In general, in order to have the opportunity to measure, determine, repeat the tasks in the educational process, it is necessary to know the criteria for achieving each goal, that is, the purpose of education should be laid so that it is possible to draw a clear conclusion about the achievement.

The educational process forms the basis, core of modern pedagogical technology and is represented as a system consisting of elements such as the purpose of education, the content of education, student, form of education, methods, tools and educator. The constituent elements serve to illuminate the technological general essence of the educational process in mutual unity and interrelationship.

Technological approach to the educational process is organized in accordance with the following basic conditions [4]:

1) the emergence of social (or personal) needs for the acquisition of education, the acquisition of certain theoretical and practical knowledge;

2) the awakening of stimulus to the acquisition of education, the acquisition of certain theoretical and practical knowledge;

3) to determine the content of student's educational and cognitive activities;

4) availability of factors that drive the management of student's educational and cognitive activities.

Today, the incentive to education and its content can be a guarantee of the success of the educational process [10]. After all, in the recent past, the participation of students in the educational process is sufficient by their role in the quality of theoretical knowledge acquired and mastered, the subject demonstrating practical skills, according to the requirements of educational technology, the leading subject of the educational process of students, manifested as the main performer. Now the students do not receive the information transmitted by the teacher. Rather, the trainee's ticket, in accordance with the instruction, assimilates theoretical knowledge by independently acquaintance with the proposed educational resources, creates practical skills and qualifications under the supervision of the teacher. Students are required to be able to conduct independent activities, promote independent and Free Thought in themselves on the basis of mastering theoretical knowledge, bring up evidence, educate the ability to defend their own opinion, self-criticism, decide on the qualities of self-assessment. Now it is forbidden to turn students from being a slow listener of the educational process into an active participant.

The leadership role of the educator in the educational process gives the opportunity to solve the following pedagogical tasks:

- To find a solution to the internal need for mastering knowledge in students;
- Form a conscious approach to the assimilation of knowledge;
- Formation of skills of independent activity in students;
- Ensuring students ' activity;
- To develop and improve the skills of independent thinking, analysis of the essence of theoretical and practical knowledge, to draw conclusions on them,to generalize them and to apply them to their practical activities.
- Formation of self-control, evaluation qualities.

The purpose of the educational process should be clearly defined. Such determination of the educational goal creates the opportunity to draw conclusions on the level of organization and implementation of the didactic process at a certain and valid time.

The diagnostic designation of the target is characterized by the following:

– The moral and moral qualities that are formed in a person, as well as the intellectual potential, are guaranteed to this extent clearly and clearly, as a result of which it will be possible to easily distinguish them from the qualities that a person shallots in any desired, pre-situation time interval;

– There will be a clear method aimed at real control over the level of formation of diagnosed moral and intellectual qualities of a person;

– Tt will be possible to determine its effectiveness on the basis of the results of the control conducted to determine the diagnosed qualities of the individual;

– On the basis of measurement criteria, there will be indicators of assessing the quality of certain knowledge, skills and qualifications.

This means that the purpose of the educational process is based on the content of the social order and the interoperability of the models of the student personality.

Formation of the educational goal at the stage level the goal at the actual level is divided into specific stages of educational preparation. Due to the fact that the educational system is oriented towards the profession without integrity, the model of the student's personality remains its object. In the process of education, the age indicators of the individual are ranked, proceeding from the main goal, in accordance with the stages of its natural formation.

Thus, the content of the educational process serves to ensure a positive solution of such tasks as teaching, upbringing and development of the individual [13].

RESULTS AND DISCUSSIONS

Pedagogical technology is based on a technological approach. The technological approach is understood as a situation in which the process used in the production processes to obtain a finished product (similar to the production technology) is understood and guarantees the expected results in achieving the set goals.

L.V. Golish according to [2], if we understand that the way of knowing the method, the way of research or the acquisition of a certain field of practice and theoretical knowledge in an activity

is a complex of actions, operations, methods, then pedagogical technology in a certain sense implies the achievement of the necessary results in educational processes.

There are many signs that distinguish pedagogical technology from traditional teaching methods. Pedagogical technology differs from traditional methodology primarily in the setting and achievement of goals [6]. Pedagogical scientist M.Ochilov noted that-the component of the pedagogical technology method includes the development of the general objectives of education (the goals of the teacher and the student), the transfer of educational goals to control (test) assignments, the methods of achieving the goal [5].

Relying on the collaborative pedagogy that expresses the relationship between the teacher and the student, the joint education of the students is carried out. The main methods of modern pedagogical technologies, such as joint education of students, the design of educational processes, and the design of work with students, etc., are considered [1].

The new pedagogical relations established in the educational process require the use of modern pedagogical technologies in this process. Different approaches are used in the science and practice of pedagogy. They are oral-visual, research-driven, systematic, functional, komplex, technological, active approaches [14].

The introduction of modern pedagogical technologies into the educational process requires a positive performance of the teacher [7]. The educator must have complete information about the external opportunities that help him in himself, that is, the availability of theoretical and practical, educational weapons and tools [8]. The educator should have the ability to orientate on the basis of available information and opportunities on the direction of education, as well as on the intended purpose of advanced teaching methods.

It is known that modern pedagogical technologies are based on the principles of developing education and should be directed towards educating the student personality. At the center of the theory of pedagogical technology is the leader of the educational process, at the same time, teachers and students who are both subjects and objects of this process. Therefore, it is necessary that the interaction, interaction between these subjects, their interaction with each other, be able to meet the requirements of the most modern pedagogical technologies from the influence they have on each other. For this purpose, the teacher, first of all, the requirements for the organization of the educational process, the principles of organization and management of education, the ways in which the student develops intellectually and physically methods of service, cooperation with him, directing him to study and study, the correct organization of the activities of the student personality, the introduction of communication with them, the, the student must be armed with techniques that allow him to accurately and correctly evaluate his activities.

Although modern pedagogical technologies have common didactic principles, they also have the following principles that are inherent in the same:

1. The principle of one integrity, integrity. This principle reflects two aspectstiradi:

– Unity of education and training and personality;

– The fact that modern pedagogical technology has a certain, strict system, the concept of “systematism” in this place symbolizes the uniqueness of both the process of teaching a particular subject and the general educational process.

2. The principle of reasonableness (fundamental). This principle is in different directions according to the object, internal essence and characteristics of the study of sciences and expresses the advantages of the study. Educational sciences arecategorized in the style of natural, social and humanitarian Sciences. Each educational science has a basic quantitative data, these data serve asa base concepts by which an individual can learn the basics of the sciences, obtain independent knowledge in a specific specialty, pass on the acquired knowledge.

Such a competent approach also makes it possible to use the feature of scientific communication in the process of training specialists in a certain direction. The combination of Educational Sciences in a certain direction in a certain way reduces tension in relation to the memory of a person, and also increases the power of thinking, promotes the occurrence of thinking.

3. The principle of cultural awareness (compliance with the development of cultural life). This principle has not lost its relevance to this day either. The principle of cultural awareness implies that students are educated based on the level of cultural development of their social society. In the last century, when the level and skill of the educator was recognized as a leading factor in ensuring the effectiveness of education, it became clear that today the teacher can not only achieve success with a high level of knowledge, potential and skills. In this place, it is important to pay attention to modern science and technology opportunities, in particular, computer, multimedia tools, as well as social and economic development of society. Now it is necessary for specialists to have a good knowledge of the peculiarities of their field or directions, to be able to carry out theoretical and practical knowledge, certain activities, to be able to solve specific tasks within the specified period and to achieve certain achievements.

4. The principle of humanization of educational content. Humanization refers to the introduction of social sciences (history, culturology, sociology, psychology, philology, etc.) into the list of subjects studied in educational institutions, while the concept of humanization refers to a positive approach to the person and his activities. In other words, if humanization is the process of organizing activities based on the human factor, respect for its dignity, honor, dignity, rights and duties in the process of relations between man and society, then humanization is the process of activities organized on the idea that “all conditions are for man and his perfection”.

In the design of the educational process, each teacher must strictly adhere to this principle, or it is desirable to pay attention to the fact that when solving problems related to his specialty it is in harmony with the interests of society.

5. The principle of teaching, research, research, teaching. This principle serves to illuminate two aspects:

1) Every teacher of educational institutions should conduct research involving students in their field:

2) The teacher develops educational technology, tests it in practice, observes and makes corrections, i.e. he studies the educational process.

These two aspects of the teaching process are important, as they provide a basis for improving the professional and pedagogical skills of teachers and thoroughly preparing students for future professional activities.

6. The principle of continuity of education. This principle implies that students have professional qualities, the existing qualities are improved during life activities. It is impossible to give a

person the knowledge that will help him for the rest of his life, because the existing knowledge changes and enriches the content every five to ten years. Thus, this principle means that the teacher pays attention to the organization of independent learning in his work, to create conditions for students to learn independently from the education provided by the teacher's leadership.

7. The principle of the folly approach is based on the didactic connection of theory and practice. In didactic theory, the concept of knowledge is interpreted in two different ways:

a) Knowledge that students need to acquire;

b) Knowledge acquired by them and applied in the process of practical activity, which has become a personal experience.

Knowledge is strengthened only in the process of activity, so it is necessary to cultivate in students the ability to apply theoretical knowledge in practice. Knowledge that has no application in practice will soon be forgotten.

Thus, these are the basic principles of pedagogical technology, that is, the initial rules. The organization of pedagogical activity in accordance with them increases the pedagogical skills of the teacher, the acquisition of intellectual and moral qualities of students, as well as the formation of personal experiences in them.

CONCLUSION

It is expedient to take the following measures to generalize and apply in practice the work on the introduction of pedagogical technologies in the educational process, especially the creation of a modern system of pedagogical technology of the systematized educational process using the experience of pedagogical technologies in foreign countries:

1. Between the participants of the educational process - the teacher and the students: the development of the curriculum, that is, when the teacher develops a plan for the study of the department and the chapter, this plan should reflect the activities of students and teachers. The consistent planned distribution of educational work between teacher and student, which is one of the principles of modern pedagogical technology, requires the teacher to consistently manage the educational process.

2. Targeted use of internal communication and inter-citizen communication opportunities of science. Each learning unit, small and large, relies on what has been learned before. Interdisciplinary connections and knowledge of students' preparation levels are also important. This means that when introducing a student to a new chapter, chapter, it is possible to rely on the existing knowledge, if the existing knowledge is not enough to study a new chapter, intermediate preparation, and only then move on to the next stage of learning.

3. Defining learning criteria. Learning criteria consist of concepts, definitions, rules, laws, events, events that a student should learn, and the provision of a logical connection between them leads to the mastery of this chapter or section. The teacher chapter is the criteria that students should study in the hours allotted for the department, and the marginal value of the assessment of student knowledge is determined. When creating a curriculum, the teacher and students identify the units of study they need to know by sections, chapters, and assign them a task before studying the section as an independent assignment.

4. Diagnostic analysis. Diagnosis is carried out in order to identify gaps in students' knowledge, to fill them and take them to the next stage of mastering. Diagnosis is one of the key elements of educational technology, ensuring that the outcome of the educational process is guaranteed by identifying the hours of deficiencies in basic mastery, determining the level of knowledge of each student, making adjustments to the course.

5. Make a correction. If the result of the diagnostic analysis of the level of mastery of the department or chapter gives less than 50%, the teacher must make adjustments to the course of the educational process.

6. Replenishment (elimination of defects). The purpose of the revision is to address the shortcomings in the knowledge gained. Defective situation must be reported to seller.

7. Get the expected result. This element is the central idea of modern pedagogical technologies. While pedagogical technology requires that the outcome of the educational process be guaranteed, it makes it a task for teachers to ensure that the intended purpose of the process is achieved and planned to be effective.

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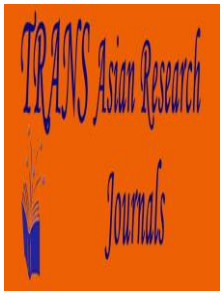

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THE ETHICAL ESSENCE OF CIVIL SOCIETY AND THE STATE

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ABSTRACT

This article deals with the civil society as a set of non-political, as well as social relations outside the framework of power-state structures.The problem of civil society is one of the key issues in modern political thought. Strengthening its relevance in the XXI century. Due to the ever-deepening processes of democratization of public life, requiring a clearer division of the functions of the state and civil society, an increase in the role of citizens and their voluntary associations in the functioning of all spheres of life.

KEYWORDS: *Civil Society, System, State, Structure, Values, Self-Government, Economics, Politics.*

INTRODUCTION

The problem of civil society is one of the key issues in modern political thought. Strengthening its relevance in the XXI century. Due to the ever-deepening processes of democratization of public life, requiring a clearer division of the functions of the state and civil society, an increase in the role of citizens and their voluntary associations in the functioning of all spheres of life.

By virtue of this, the identification of the essence and problems of the formation of civil society, the determination of its qualitative parameters in relation to the existing realities allow ensuring close interaction between the state and civil society as the basis of political stability in society.

In the modern view of political scientists, civil society:

-This is a set of non-state relations of people - moral, religious, socio-economic, family and social communities (institutions) that are outside state structures, with the help of which the interests of individuals and their groups are fixed and satisfied;

-Social interaction of the population of a given territory in the economic and social areas on the principles of self-regulation, self-government, based on personal equality and the norms of traditional hostel (state regulation acts only in order to control anti-social actions);

-The highest modern stage and form of human community, which includes as structural elements voluntarily formed primary communities of people: families, public organizations, cooperatives, associations, professional, creative, sports associations, unions, guilds, clubs, foundations, and so on, excluding state and political structures.

Civil society is a mature stage of the historical development of society. Citizenship is a measure of a person's political development, his ability to live not only in a family and his own home, but together with others and for the sake of others. And only in this capacity can people form a society called civil. A developed civil society is built as an interaction of organized entities. It consists not only of the activities of individual individuals, but also of the interaction of organized groups, associations, institutions, local self-government bodies and other public formations.

Civil society is a system of individuals, groups and institutions that are independent (at least directly) in their activities from the State, its bodies and institutions. Civil society can also be defined as a set of non-political, i.e. public relations outside the framework of governmental structures.

According to the leadership of the Republic of Uzbekistan, it is the mahalla that should become the foundation of civil society. It should combine both traditional national values of self-government and new, modern methods of self-government of societies, overcoming economic and political backwardness, in the name of decent human conditions. Mahalla, as a type of self-government and as a type of social self-government, leads primarily to the decentralization of power, a change in the way the subject and object interact.

Although the mahalla is not a religious organization, it promotes the spread of traditional Islamic ideas. It helps to organize the main events of the people's life, such as weddings, funerals, and various holidays. "Hashar" is a traditional way of mutual assistance. Collectivist moral life positions have been well preserved in neighboring territorial communities (mahallas) common in Uzbekistan, representing a layer of socionormative culture that characterizes the spiritual appearance of Uzbeks. Hospitality is one of the characteristic features of Uzbek life, a guest in every family is considered a respected person. In Uzbek society, there has always been a high moral orientation towards the opinion and respect of others. The correlation of one's behavior with traditional standards is the most important component of the Uzbek mentality. In the socionormative culture of the Uzbeks, one can find traditionally fixed attitudes for human behavior for almost all standard cases of life, which are formed from childhood. Respect for elders and the elderly is one of the important components of the system of value orientations of Uzbeks. Often grandparents are the nominal heads of families (even if the primacy does not exist due to old age). All other family members listen to their decisions and advice. The tradition of visiting, gifting and treating elderly relatives, neighbors, acquaintances on holidays is observed.

In the Uzbek language there is a concept of "savob ish" (a good deed or a boon). Such good deeds include helping widows and orphans. The aphorisms that exist among the population, traditions about the deeds and activities of outstanding people, their sayings and instructions, together with religious legends from the lives of saints are of great importance in moral education. In Uzbek society, the traditional ethics of human behavior represented an entire life system. The moral behavior of the individual has always been given special importance in it.

Moral beliefs, principles and norms constitute the spiritual core, the innermost foundation of the individual, therefore they cannot be imposed from the outside. Moral education is inseparable

from the very existence of a person, his life as a rational being with freedom of choice. It is the process of moral self-determination of a person, the creation of himself through his own actions and behavior. In general, moral education as a spiritually meaningful, personally conscious process has two mutually dependent sides: the formation of the person himself, his improvement, and the improvement of society, the human world. Moral education is the education of a person in his integrity, the formation of fundamental human qualities, and not the cultivation of some of his individual specific traits and features. In the complex process of human formation, the following specific moral gains can be distinguished, which constitute a minimum of humanity: understanding of the irreducibility of morality, its absolute unity with human existence, its vital importance.

Based on the foregoing, the following definition can be given: civil society is a set of those interpersonal, family, socio-economic, cultural, religious relations and structures that develop in society outside the framework and without direct state intervention and provide conditions for the self-realization of individuals and collectives.Adherence to universal human values is the social setting of the emerging civil society, the content and goal of the state's spiritual policy. For, in order to build a civil society with a highly developed economy and culture, it is necessary to assimilate the most advanced achievements of the world community in all spheres of social and economic life, to enrich the national with universal humanity. Knowledge of the spiritual heritage also serves as the spiritual basis for building a civil society. Since it serves to strengthen and develop national identity, national pride, national identity, a clear definition of its place in the process of global progress. Love for one's Motherland, pride in it, willingness to sacrifice for its sake, concern for its prosperity are the most important manifestations of patriotism, which are considered one of the foundations of the formation of civil society. Correctly understood, patriotism, free from nationalism and national narrow-mindedness, is also a social guideline in the construction of civil society. The ability to harmonize national interests with the requirements of our time is also related to the spiritual foundations of building a civil society.

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OPEN FLOW-BASED MULTI-CONTROLLER MODEL FOR FAULT-TOLERANT AND RELIABLE CONTROL PLANE

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ABSTRACT

Software-defined networking (SDN) technology is an approach to network management that enables dynamic, programmatically efficient network configuration in order to improve network performance and monitoring, making it more like cloud computing than traditional network management. SDN which decouples the control and data planes of the network, is one of the most promising paradigms in the recent networking architectures. The SDN concept relies on a centralized controller. However, a centralized architecture faces the challenges of scalability, availability and fault-tolerance. OpenFlow (OF), the most commonly used southbound interface for SDN, makes the provision of using multiple controllers. In this paper, we propose FOIL, a new Fault-tolerant OpenFlow multi-controller model with ICMP-based lightweight inter-controller communication for achieving fault-tolerance and reliability in the SDN control plane.

KEYWORDS: *FOIL, ICMP, Multi-Controller, Openflow, Reliable Control Plane, SDN.*

1. INTRODUCTION

The software-defined network (SDN) has many advantages over the traditional network architecture in terms of flexibility, openness, programmability and cost-effectiveness. SDN has a centralized control architecture which makes the network programmable from a controller device. Single controller is vulnerable to single point failure and puts questions on the reliability of the network. In order to ensure reliability, researchers have been working towards developing a suitable architecture for multi-controller SDN. OpenFlow (OF) is an interface for SDN to program and control the switches of the network[1].

Using OpenFlow, the controller can read switch statistics and write, delete or modify rules installed in the switches either proactively or reactively. OpenFlow controller exchanges OpenFlow messages with OpenFlow switches over asecure channel. OpenFlow provides a basic

framework for multiple controllers but keeps the options for detailed architecture open[2]. In this paper, we propose a Fault-tolerant OpenFlow multi-controller model with ICMP-based lightweight intercontroller communication named FOIL for ensuring the reliability of the SDN control plane for DCNs (Figure 1). FOIL provides a mechanism for high reliability and fault-tolerance. The proposed controller is implemented on a Mininet-based emulated test bed for performance study[3].

In order to check that the MASTER is active, the EQUAL controllers periodically send echo request messages to it. If an EQUAL controller does not receive echo reply within suitably chosen but randomized timeout period, it again checks for the controller IP in the native-controller-list to confirm that MASTER has not changed during its echo request[4]. If there is no change in the MASTER, then it assumes that the MASTER has become inactive. The following steps are taken thereafter:

- Once the EQUAL realizes that the MASTER is either not active or not reachable, it sends echo request to all the other controllers to notify indicating its intention of replacing the current MASTER, the notification will be sent with a time-stamp. If there was notification received from any other EQUAL, it withdraws from contention.
- If the current MASTER inactivity was due to some temporary reason, it will respond with the broadcast of an echo request with an ACTIVE message to notify all the controllers in the cluster of its being active.
- If no ACTIVE message is received within a set period, the other EQUAL/SLAVE controllers verify the validity of the IP address of the requesting EQUAL controller in the native-controller-list. If it is found to be a valid EQUAL controller, the other controllers send echo reply in acknowledgement.
- If a contender EQUAL receives a notification for replacing the current MASTER from any other EQUAL, it compares the time-stamp in the notification with its own time-stamp. If its own time-stamp is older than the other contender, then it becomes the first contender. Else, it withdraws from the contention.
- The first contender EQUAL controller on receiving acknowledgements from all other controllers in the cluster, other than the inactive MASTER.

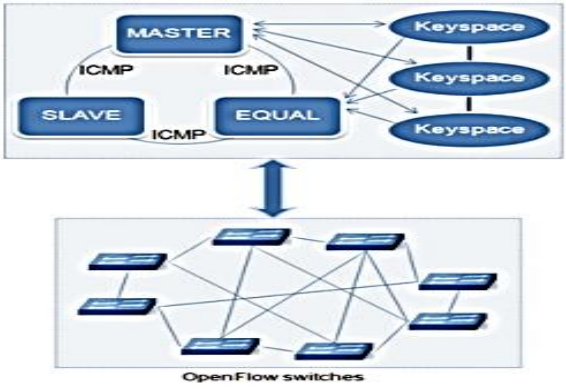

Figure 1: FOIL Controller Cluster is Connected to All the Switches; Controllers Communicate to Each Other Via ICMP

The contender EQUAL node sends role request to MASTER message to all the OF switches under the control of the inactiveMASTER. On receiving a role reply message from a switch, it elects itself as the new MASTER for the switch and issues barrier request message to the switch to finish any pending task at the switch. On completion of the migration of all the switches, the new MASTER notifies the active SLAVE nodes for selection of a new EQUAL by sending an echo request to it. The SLAVE sending the earliest echo reply is selected to be the next EQUAL. The new MASTER notifies the selected SLAVE to change its role EQUAL[5]. The SLAVE immediately on receiving the second echo request sends role request to EQUAL message to all the switches. On receiving echo reply from a switch, it becomes an EQUAL node for that switch. The new MASTER now updates the IP addresses of the new MASTER, EQUAL and SLAVE controllers in the native-controller-list of the cluster in the database.

Normally, an EQUAL controller will not respond to any asynchronous message received from the switches in order to satisfy the safety property requirement. But after a MASTER controller failure is detected by any EQUAL controller, it starts processing the asynchronous messages. Multiple EQUAL nodes may process the asynchronous messages till a new MASTER is selected. EQUAL controllers stop processing the asynchronous messages once the MASTER controller IP is changed or updated in the native-controllers-list of the cluster[6]. This is to avoid loss of asynchronous messages without being processed during a MASTER controller failure. Similarly, a SLAVE controller checks whether at least one EQUAL is active (Figure 2).

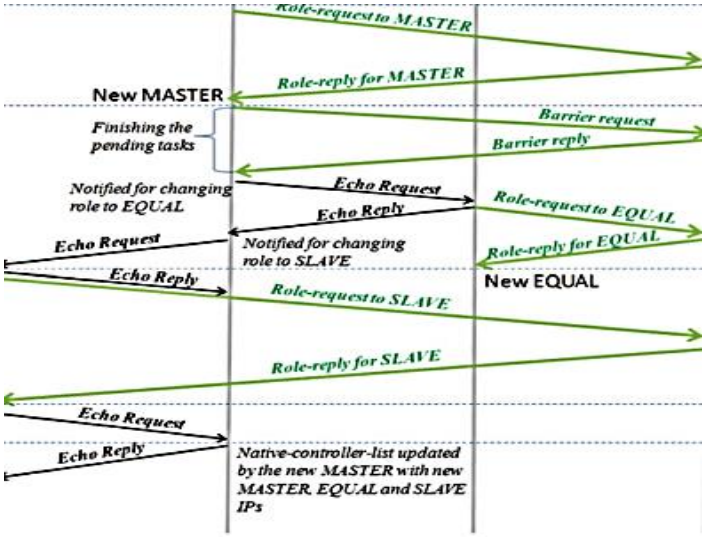

Figure 2: Switch Migration for Recovery from the MASTER Failure

2. LITERATURE REVIEW

Static configuration between controller and switch creates difficulty in terms of handling unpredictable traffic in the network. In such a case, it is required to migrate the switches from a heavily loaded controller to a less loaded one using distributed controllers. OpenFlow provides a multi-controller model which allows multiple OpenFlow controllers to exist in the same network[7]. In the multi-controller scenario, the roles of the OpenFlow controllers are formulated in three categories, namely—MASTER, EQUAL and SLAVE. A MASTER or EQUAL controller role has complete access, including reading asynchronous messages from the switches and writing or modifying actions on the switches except that there can be only one MASTER for a switch, the controller in charge.

The EQUAL role is the default role of any controller. A SLAVE controller has read-only access to the switches. It does not receive asynchronous messages from the switches and cannot write new rules or modify any rule on the switches[8]. When a new MASTER controller is selected for any switch, it changes the role of the earlier MASTER to SLAVE. As a switch can connect to multiple controllers at a time, the OpenFlow multi-controller model provides the scope to incorporate failure avoidance and controller load balancing. Here, the controller handover can occur in a distributed manner but no definite basis and scheme for the controller distribution, load balancing, failure recovery, etc., have been specified. It is therefore important to develop suitable mechanisms for the OpenFlow multi-controller framework to achieve desired reliability and fault-tolerance. The distributed multi-controller implementation must satisfy two important properties at any given time—safety and liveness[9].

Safety requires each OpenFlow switch to listen to only one MASTER or EQUAL controller for the processing of asynchronous messages and liveness requires that at least one controller is active, either MASTER or EQUAL, for each one of the OpenFlow switches. Physically distributed multiple SDN controller designs found in the literature can be categorized into two types—logically centralized and logically distributed [5]. In a logically centralized design, there are multiple controllers but each controller has thesame global view of the network and works with similar responsibilities. In logically distributed design, controllers are physically as well as logically distributed, and the individual controllers may not have a global view of the network. Instead, each may be responsible for a domain of the network and perform a given set of functionalities.

ONIX [6] is one of the logically centralized distributed OpenFlow controller architecture which provides a distributed control plane with cluster of servers running several ONIX instances. It maintains a network information base (NIB) which contains the entire network state that is shared among all the ONIX instances. The ONIX instances require updating the NIBs through database transactions each time any state information is to be communicated between any two controllers and this makes the overall system slower due to frequent database transactions[10]. Elasticon is another logically centralized architecture with a cluster of controllers sharing the workload by using a flexible switch assignment and migration scheme with role switching. It maintains the global network view using distributed data store modules.

Elasticon shows that load balancing improves the controller performance. However, the issue of controller assignment to the switches of a large network has not been addressed in Elasticon. Kandoo is a logically distributed architecture with two layers of controllers, namely, the local controllers and a root controller running different applications[4]. The local controller queries switch to detect elephant flows and once detected it notifies the root controller to install or update flow entries on network switches. For intercontroller communication, local controllers must signal the root controller which makes the local controllers dependent on the root controller. A failure in the root controller may lead to failure of the network. Reported results show performance improvements in Kandoo as compared to the traditional OpenFlow.

Logically centralized architectures like ONIX and Elasticon work by storing the global network state in distributed data stores. The latency in accessing the distributed data will, however, grow when the global network state information base becomes large. It is therefore required to minimize the volume of data to be accessed from distributed data stores and inter-controller communication should be made light with minimum use of transactional databases. In a multi-controller environment, dynamic assignment of the switches to the controllers is conceptually

simple but hard to achieve without disrupting normal network operations [6]. Further, frequent migration of a switch among controllers may affect the liveness of controller operations. The existing distributed architectures generally tend to use the popular distributed routing protocols like BGP, OSPF, IS-IS, etc., for inter-controller communications. But, these protocols generate routing overhead due to the broadcast of link state databases. Hence, there is need for a distributed architecture with suitable dynamic controller allocation mechanism for load balancing and failure recovery while making inter-controller communications light.

3. DISCUSSION

The performance study of FOIL was carried out on an emulated set-up on an IBM Server x3500 M4 model having Intel(R) Xeon(R) CPU E5-2620 2.00 GHz processor. A three-level tree-based topology was created for experiments in Mininet comprising one core switch, two aggregation switches, n number of access switches connected to each aggregation switch and a single host connected to each access switch. An experimental test bed is created using Mininet with OpenVSwitch (OVS) software switch and floodlight controller which support OpenFlow version 1.3. We modify the source code of the software switches used in Mininet, i.e. OpenVSwitch (OVS), to generate a large volume control traffic required for our experiments. Mininet runs on a Xubuntu VM allocated with four CPU cores and four GB RAM. Each controller instance runs on a Lubuntu VM allocated with one CPU core and one GB RAM. Necessary modifications are made in the OVS source code in order to generate a large volume of OpenFlowpacketin message traffic (Figure 3).

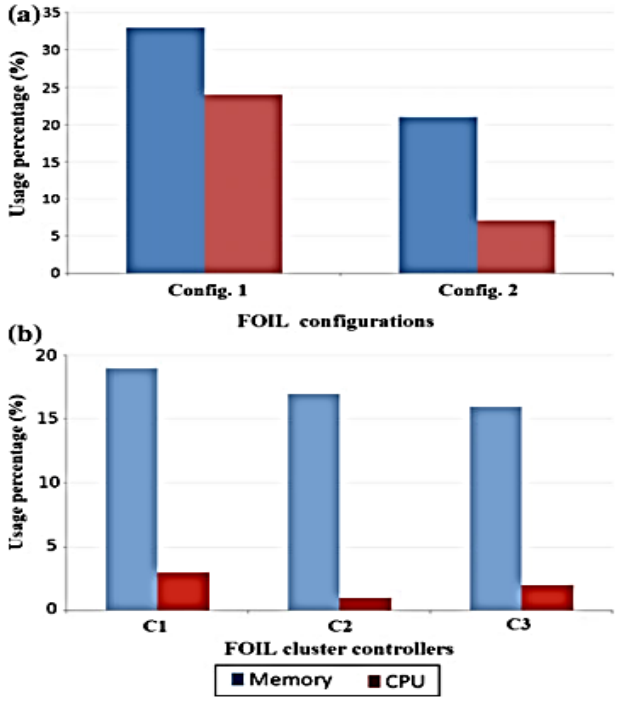

Figure 3: (A) Average Memory and CPU Usage Percentage Per Controller in each Configuration, (B) Average Resource Utilization in the Controllers.

With the changes in the OVS code, a tree topology with 131 switches can generate up to 30 Mbps of OpenFlow traffic towards the controller. While generating traffic, each controller uses the default forwarding module, topology manager and link discovery module. Major portion of

the controller traffic is generated by the sequential ICMP messages communicated by all the 128 hosts in the topology. In FOIL, inter-controller messaging is done by ICMP messages shared among the controllers. These inter-controller ICMP messages are detected by TCPDUMP [15] installed in the controller system which notifies the controller about incoming ICMP messages. CPU and memory usage data of the controller devices is collected by the controller by executing shell commands at regular intervals of one second. Whenever the CPU or memory usage of any controller goes beyond the set threshold values, FOIL load balancing procedure is invoked by ICMP message exchange. All the experiments are performed 20 times and results are averaged to obtain final figures for the experiments where average values are taken.

4. CONCLUSION

In this paper, we have presented FOIL, a Fault-tolerant OpenFlow multi-controller for the reliable SDN control plane. It provides efficient mechanisms for load balancing among controllers and for failure recovery in the controller cluster. The intercontroller communication is made lightweight with use of ICMP. Performance study of FOIL is carried out in a Mininet-based set-up. From the experimental results, it is seen that FOIL is efficient in terms of failure recovery and load balancing. It achieves a balanced utilization of controller CPU and memory and minimizes per controller traffic load. Further, it introduces a very small delay in switch migration and the controllers display fast response towards the queued OpenFlow packets. The TCP packet loss experienced for switch migration during load balancing is nil and that during controller failure recovery is negligible. Thus, FOIL provides fault-tolerance and thereby reliable control plane for OpenFlow using a distributed approach.

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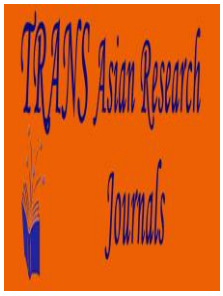

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SOCIAL ENGINEERING ON DIFFERENT TYPES OF ONLINE FRAUDS

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ABSTRACT

Scammers employ social engineering to effectively use human vulnerabilities and carry out emotional assaults on unwitting victims. The contents of 100 phishing e-mails and 100 advance-fee-scam e-mails were reviewed, and the persuasive methods used by social engineers for their illicit profits were assessed. The studies revealed that alerts and account verification were the two most common triggers utilized to get phishing e-mail recipients' attention. These phishing e-mails were often accompanied by a menacing tone shown via haste. Timing is less important in advance-fee e-mails; the primary motivator is the possibility for financial benefit. The two most frequent incentives utilized to entice victims were business offers and big unclaimed money. According to the findings, social engineers employ positive and negative comments, as well as authoritative and urgent persuasions, to influence innocent people's response choices. Because it's doubtful that internet fraud will ever be fully eradicated, the most effective approach for combating social engineering assaults is to educate the public about the dangers that criminals pose.

KEYWORDS: *Advance-Fee Scam, Internet Fraud, Online Fraud, Phishing, Social Engineering.*

1. INTRODUCTION

In the investigation of online fraudulent behaviors, the concept of social engineering has lately emerged. The exploitative character of misleading communications used by social engineers in the execution of fraudulent actions has been the focus of this line of study. People fall prey to scams because they are uneducated, naive, or greedy, according to accounts of such actions. Instead, this research suggests that neither gullibility nor ignorance can account for the effectiveness of such deceptions. The research, which will concentrate on online fraud, will demonstrate how social engineers may use psychologically built interactions to acquire desired

behaviors and privilege information. With a disguised, appealing e-mail, these con artists may expertly lead victims into an emotionally vulnerable condition[1]. The seriousness and repercussions of internet scams necessitate a look into this kind of crime.

Attacks against social engineering are carried out on both a physical and psychological level. The workplace, telephone, trash cans, and the Internet are the most frequent places for the social engineer to seek illegal information and access in preparation for a psychological assault. Persuasion, imitation, ingratiation, compliance, and friendliness are all targets of psychological assaults. To start and execute their assaults and elicit automatic emotional reactions in their victims, social engineers depend on cognitive biases or mistakes in the mental process. Choice supporting bias, exposure effect, and/or anchoring are examples of cognitive biases. When someone has a propensity to recall previous events as being more good than bad, this is known as choice supporting bias. For example, an eBay buyer may inadvertently provide his or her credit card information to a fake site masquerading as eBay, stating that payment for a bought item has not been received[2].

People will gather and interpret information in a manner that supports their beliefs, according to confirmation bias. Employees who are used to seeing caretakers in particular uniforms, for example, may not be concerned when they encounter an impostor wearing the same outfit. As a result, the social engineer may obtain access without revealing his or her identity. People prefer things and people they are acquainted with, according to the exposure effect[3]. Someone who uses online social networks, for example, may be more likely to visit a malicious website purporting to provide a "online dating service." Anchoring implies that a person concentrates on recognizing a distinguishing characteristic. Visitors may be misled by fake websites that show similar logos to legitimate banks. Fundamental attribution bias, salience effect, and pushing conformity, compliance, and obedience may all lead to social mistakes.

Individuals assume the actions of others and immediately reflect permanent traits that characterize the person, according to the fundamental attribution mistake. As a result, social engineers attempt to create a good first impression in order to win their victim's confidence.

On the other hand, discovered that social engineers have attacked internet users by using persuasive arguments in either positive or negative tones—or both[4]. According to the salience effect, the individual who sticks out the most in a group has the least influence. As a result, social engineers are masters at blending in with their environment. People alter their actions in response to pressures of conformity, compliance, and obedience. Social engineers have figured out how to anticipate how people will react to these demands. A social engineer may impersonate an executive utilizing power and persuasion, and even without presenting identification, persuade an employee to divulge sensitive information. To assist them design the optimal offensive strategy, social engineers utilize cognitive biases and social mistakes. The degree to which a person is aware or recognizes something influences their decision-making.

A person who is considered to be evil is usually avoided, while a nice or familiar person is generally welcomed. By presenting oneself in a favorable light and creating excellent first impressions, social engineers take advantage of this. Social engineers have developed new methods to alter behavior based on their understanding of cognitive biases and mistakes.

1.1.Social Engineering Attacks*:*

Only the hacker's imagination limits the variety and scope of social engineering assaults. These assaults are successful because they target an organization's most susceptible link: its people. Social engineering attacks have the ability to get around even the greatest technological protection and reveal a company's most sensitive data. Trojan e-mail and phishing messages, advance-fee fraud, impersonation, persuasion, bribery, shoulder surfing, and dumpster diving are just a few examples of social engineering assaults. Two of the most popular types of social engineering assaults are Trojan e-mail and phishing communications.

1.2.Different Types of Online Fraud

Credit card fraud, identity theft fraud, web and e-mail spoofing (also known as phishing), IM spimming (similar to spoofing but involves the use of instant messaging), high-tech catastrophe fraud, and online hoaxes are some of the more prevalent types of online fraud (referred to as advance-fee fraud). While each kind of fraud may take up a lot of time, the present research focuses on web and e-mail spoofing (phishing) and online hoaxes (advance-fee fraud), since these are two of the most well-known and recognized frauds using a range of misleading methods used in online interactions.

1.3.Phishing

Phishing is a rapidly expanding field of Internet fraud, with an increasing number of victims. In 2007, 124 million people in the United States reported getting phishing e-mails, up from 109 million in 2005. Phishing, according to Jakobsson and Meyers, is a kind of social engineering in which an attacker (or phisher) impersonates a reputable or public institution to get private or sensitive information[5]. Phishing, sometimes known as brand spoofing, involves sending e-mails that seem to come from companies with whom the victims have previously worked or are presently affiliated. There has been a worrying trend in the growth and sophistication of phishing assaults in recent years. Banks, online companies (e.g., eBay and PayPal), and online service providers are some of the most frequent firms and sectors linked with phishing (e.g., Yahoo and AOL). Unsuspecting victims get e-mails that seem to be from these organizations, typically implying that the account has been compromised and demanding personal information (e.g., personal identification numbers, credit card numbers, and social security numbers). In the end, the phisher wants to exploit the victim's personal information for personal benefit. Up to 20% of those who receive the e-mails reply, which may result in money losses, identity theft, and other kinds of fraud. Scammers may steal information directly or use social engineering to convince people to reveal financial information by associating with particular kinds of "brands."

1.4.Operation Phishing

Phishers typically use two main techniques to steal sensitive personal information. The first approach includes infecting personal computers with malicious software via technological deception. This program is capable of capturing the user's keystrokes and transmitting those data to the phisher.Typically, social engineering techniques send a fake e-mail to the recipient, encouraging them to visit a connected website that seems to be from a legitimate company. When the user clicks the link, they are sent to a fake website that requests personal financial information such as credit card or bank account details. Phishers then use the information they've gathered to steal money from the victim's credit card or bank account, or even apply for a new credit card under a fake name. Social engineering apps use a variety of phishing techniques and targets. While some e-mails include basic fill-in forms, others use a variety of fake websites to

target their victims. Because phishing is primarily used for financial gain, financial services was the most frequently targeted industry, accounting for 74% of all reported phishing activity[6].

The Internet service provider was the second most active phishing target, accounting for 9% of all cases. Although fraudsters are less likely to make money in this sector, they are likely to be able to utilize the stolen information and accounts to continue their phishing operations, such as sending bulk e-mails from the stolen accounts[7]. Retail is the third most profitable market for phishers, accounting for 6% of all phishing attempts. Phishers make online purchases and ask for the products to be delivered to a place where the phisher has access. The difference between financial scams (74%) and all other sectors (26%) according to a Symantec research is the greater simplicity and quick cash payoff for successful deceit.

One thing that phishing e-mail campaigns often try to do is mimic a reputable organization. Some con artists employ deception to make their e-mails seem more genuine. The use of business logos, hyperlinks to the firm's web page, and fake return addresses are examples of these tactics. The next stage in the phishing process is to produce a message that demands the receiver to perform a particular action, such as responding to the phishing e-mail, filling out a form given by the phishing e-mail, or following a guided link[8]. The messages' content varies, with the most frequent version stating that information is needed for account verification or a security update. Because fake web sites and e-mail messages are rapidly discovered and banned, the messages are usually designed to create a feeling of urgency in the recipient.

When visitors click the false link and access the spoofed site, it is critical that the web pages seem genuine to the user. Company logos and slogans, website layouts, typefaces, and color palettes are among the misleading online characteristics exploited by phishers[9]. Many online phishers are adept at not just imitating the visual appearance of genuine websites, but also at include some of the indications that consumers look for when evaluating a website's security and validity. The usage of a safety padlock in the menu bar, a https device in the URL, and the “TRUST-e” sign are all examples. Since early phishers utilized domain names that were merely similar to the genuine business they were impersonating, one could study a website's URL and be more sure of identifying a counterfeit site. Today's fraudsters, on the other hand, may display the company's genuine domain name, such as www.ebay.com, but when the user clicks on the hyperlink, it takes them to the phisher's site.

1.5.Fraudulent Payment in Advance

As has been shown, thieves utilize the Internet to perpetrate various kinds of fraud; nevertheless, advance-fee scam e-mail communications are responsible for the greatest monetary losses. Individuals claiming to require help transferring a significant amount of money out of their nation send these communications. Those who reply to these communications are often victims of fraud and identity theft[10]. The frequency and incidence of fraud, in which thieves acquire property or money from victims via deceit or cheating, has been the subject of much criminological study. The majority of frauds include some kind of contact between the victim and the perpetrator, whether it's via face-to-face meetings or phone calls. Criminals have started to exploit the Internet as a method of committing fraud since people across the globe have grown more reliant on it.

2. DISCUSSION

These phishing emails were often accompanied by a menacing tone expressed via the use of urgency. Timing is less of an issue in advance-fee scam emails; the primary motivator is the possibility for financial benefit. The two most frequent incentives utilized to entice victims were business offers and big unclaimed money. Authority and civility were used extensively in both phishing and advance-fee communications. It seems that social engineers plan to combine these two persuasive tactics in order to enhance the validity of the e-mail while also evoking the feeling of politeness that is prevalent in commercial procedures. This research also showed that social engineers use both positive and negative comments to convince readers to fall for their frauds. Online scammers have utilized e-mails to manipulate users' emotions such as enthusiasm, pity, and terror. The employment of authoritative and, in some cases, emotive persuasions has led readers to let their guard down when it comes to possible dangers. According to the findings, courtesy and formality were often employed to make the reader feel at ease and safe while replying to the e-mail. Social engineers have strategized and carried out emotional assaults on innocent individuals by exploiting human vulnerabilities. As social engineers improve their ability to attack via false persuasions, prospective victims must be prepared to defend themselves at any moment.

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Users are still susceptible to social engineering assaults due to the inherent human inclination to believe what others say. Finally, the greatest approach to protect yourself against social engineering assaults is to educate yourself. This may be done through instilling in users a sense of the importance of the information resources available to them, as well as raising knowledge of human hacking methods, making it simpler for users to spot a social engineer. Governments and companies have embraced education as a method to combat internet fraud. Organizations have made efforts to increase awareness of social engineering via lectures, booklets, web pages, and security warnings sent in e-mails addressed to users.

Because they concentrate on human variables, social engineering assaults are simple to carry out and complex to fight against. Because most individuals have a helping attitude and think that this kind of assault would never happen to them, they are often duped without even realizing they have been a victim of an internet scam. Users are still susceptible to social engineering assaults due to the inherent human inclination to believe what others say. Finally, the greatest approach to protect yourself against social engineering assaults is to educate yourself. This may be done

through instilling in users a sense of the importance of the information resources available to them, as well as raising knowledge of human hacking methods, making it simpler for users to spot a social engineer. Governments and companies have embraced education as a method to combat internet fraud. Organizations have used lectures, booklets, web pages, and the transmission of security messages in e-mails sent to users to increase awareness of social engineering.

3. CONCLUSION

There have also been concerns expressed about the psychological impact of instructional efforts on consumers. From the perspective of the client, banks have long been seen as security providers that are expected to provide users with security advice and warnings.

Because regular people are unfamiliar with IT, they are aware that they must follow the specialists' advice. Users will often make choices based on their emotions and what they are acquainted with, often disregarding security risks, flawed traps, or potential financial losses. It is unrealistic to expect people to be able to differentiate between a fake and a genuine e-mail and not to follow the directions in the former. Due to the use of spoofing and software that hides an individual's location, identifying the fraudsters responsible for these communications is extremely difficult. As a result, dealing with fake e-mails is tough for law enforcement authorities.

To resist social engineering assaults, these difficulties have led to a growing dependence on technological protections created by the private sector. Phishing filters, security firewalls, and e-mail authentication devices have all been included into Microsoft's and other computer firms' online application software as frontline barriers. These companies are flexible in the face of competition and have the technological know-how to better manage and monitor the flow of e-mail messages. Their assistance in combating internet fraud has complimented many elements of police crime prevention operations. Preventative measures remain the most practical and beneficial for regular people. Never provide account information in response to a solicitation e-mail, constantly changing passwords, typing or copying URL addresses from legitimate sources instead of following a hyperlink embedded in an e-mail, and calling the financial institution directly when suspicions arise from an e-mail are just a few examples.

Overall, a fundamental knowledge of how social engineering assaults work, along with a healthy dose of skepticism, will decrease the likelihood of becoming a victim. It's reasonable that there aren't any simple methods for preventing internet fraud. More legislative initiatives in the areas of online fraud and computer crimes in general, however, are required. This means that there must be sufficient laws addressing different computer crimes and their penalties, as well as consistent court decisions on how the law may be applied to crimes committed online. Many legal experts wonder whether the legal system will be able to manage high-tech crimes in the future, despite the fact that government agencies are devoting more personnel and resources to the investigation and prosecution of computer crimes. In many cases, it seems that technology advances quicker than legislation. As soon as a law is passed to restrict a certain activity, technology advances, and the statute becomes outdated or no longer covers all potential actions. As a result, education continues to be the most effective method of preventing online fraud. Social scientists should continue to play a role in educating the public about the dangers of social engineering perpetrators.

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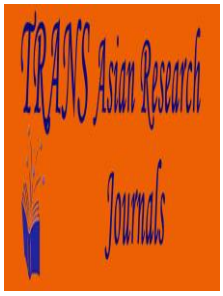

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DEVOTEES OF KNOWLEDGE

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ABSTRACT

In this article, Cholpon and Fitrat's thoughts on language and literature are covered. Fitrat's views on national language valued and widely publicized. Cholpon's reaction to literature and art is expressed.Literary studies are the study of artistic creation, the art of speech as a whole, because they are mobilized to develop the consciousness of our people, to ensure their spiritual maturity. At the same time, each artist must be distinguished from each other, although he has his own image, style, and unique laws. They have a place in life, in real life, independent tasks, different tools, weapons. Consequently, a literary study examines the artist's skill from different angles, relying on scientific discussion and observation.

KEYWORDS: *Literature, Press, Critique, Theoretical, Language, Nation, Independence.*

INTRODUCTION

Literary studies are the study of artistic creation, the art of speech as a whole, because they are mobilized to develop the consciousness of our people, to ensure their spiritual maturity. At the same time, each artist must be distinguished from each other, although he has his own image, style, and unique laws. They have a place in life, in real life, independent tasks, different tools, weapons. Consequently, a literary study examines the artist's skill from different angles, relying on scientific discussion and observation.

The infiltration of the national ideology, the idea of independence into science, in particular, Uzbek literature and criticism, is reflected in the works of art - the perfect, scientific analysis and interpretation of the literary text. Analysis and interpretation can shed light not only on modern Uzbek literature, but also on our classical literature, a thorough analysis of unique examples of world literature, a deep interpretation of the national ideology, the idea of independence. When a critic comments on a work, he shows a social view of the product of the poet's or writer's work, the essence of history. He enriches the creative work with social content, historical attitude.

THE MAIN FINDINGS AND RESULTS

The courage and bravery of people who have made a worthy contribution to the development of science in the development of society is noteworthy. AbduraufFitrat and AbdulhamidCholpon, who have a special place in the literature of the twentieth century, set an example with their advice and intellectual potential. At the beginning of the century, the intellectuals who called mankind to science and enlightenment were diligent in bringing innovation to life. They led the formation and development of the national press, the methodical school, the theater, and criticism. Importantly, they stressed the need to raise the consciousness of the people, to raise their social status. Indifference to the issue of national language and literature is a serious concern for selfless scholars.

AbduraufFitrat is an encyclopedic scholar who has thoroughly studied classical literature, the history of religion, and literary theory. In his Handbook of the Rules of Literature, views on science are scientifically based. In the deep understanding of the essence of the matter, the rich thinking and scientific potential of the scientist becomes clear. This source is notable for its clear and concise information on theoretical issues. A complete explanation of the concepts of art forms, literary science, style, skill increases the value of the manual. His articles “Our Language 1” and “Our Language 2” raise a topical issue. What is the richest, most unfortunate language in the world? Do you know? The pain in the tone of the appeal “Turkish” is felt.

It seems that the author is not indifferent to the fate of the Turkish language, he thinks boldly without being afraid to assess the real picture, the situation. He emphasizes, first of all, that the prestige of any language is associated with national pride. The richness of language emphasizes that the ability to express is determined by the dialectal feature, lexical, phonetic perfection. He reminds that “Muhokamat-ul-Lughatayn” gives complete conclusions about the structure and use of words in the Turkish language. In proving the unhappiness of the language, the critic acknowledges the Arabic language, which was introduced into circulation under the influence of the Arab conquest, and says that it has been a leader for centuries. The article acknowledges Firdavsi's courage, which honored the Persian language, and regrets that indifference caused the Turkish language to be on the way. AbduraufFitrat remembers with regret that the great scholars Ibn Sina, Farobi, Jawhari, Rumi, and Nizami originally created works in Persian by Turkish boys. Although it has been oppressed for a thousand years, it lives in Turkish, and because it is rich, it does not run out. The value of the word, the scholar who thinks about its future, urges the people, the nation to respect the national language.

When the value of our language is lost, when the opportunity to use it is lost, the author rings the bell and urges awareness. "Turkish language is rough, music is tasteless, history is dark" is the basis of the comments. There is a desire to remove Arabic and Persian words from Turkish. AbduraufFitrat makes a proposal to raise the status of the language. Concerned about the captivity of the Turkish language, it wants an independent language for the Turkish people, the development of science in that language. It is obligatory for a Turkish writer to use words in pure Uzbek. He speaks well-founded, truthful words that use words in accordance with Turkish law instead of words that are not found in Turkish. The scientific considerations in these articles are still relevant.

AbduraufFitrat is a versatile artist, an encyclopedic knowledge, who has conducted effective research in various fields of artistic and scientific creativity. He was a scholar who thoroughly mastered religious and secular knowledge, and was a sincere man who cared only for the

interests of his nation, his people. The literary scholar founded the ChigatayGurungi Society in Tashkent, which aims to study in depth the issues of Turkic peoples, in particular, Uzbek culture and art. Members of the society pay attention to the promotion of science and enlightenment, the promotion of language and literature, even in difficult situations.

Literary critical views of the scholar AbdulhamidCholpon, who considered it his duty to be responsible for the future of the nation, have always been in the spotlight of experts. This can be seen in the courage of a true man who remains faithful to his faith. At the most critical moment, the great scholar resolutely promoted the eternal theme of literature. AbdulhamidCholpon is constantly searching for a stable place for Uzbek literature on the world stage.

Critical literature is privileged to demonstrate the great power of the word through its works. His aspiration and inquisitiveness are evident in his careful observation of the works of representatives of world literature. His articles on the late "TawfiqFikrat", "RizoTawfiqbek", "Tagore and Tagore Studies", "Who is Tagore", and "The Great Indian" highlight their role in raising spirituality and their contribution to Eastern and Western literary ties. He makes a detailed observation of the biography of thoughtful writers, the laboratory of creation. In particular, Robindranath Tagore, an expert in the field of art, provides new information about his enlightenment activities. AbdulhamidCholpon also pays attention to the place of representatives of world literature in national literature. Importantly, the critical critic advocates the synthesis of Eastern traditions with Western traditions and puts forward sound proposals.

AbdulhamidCholpon finds comfort in the works of Oybek, Botu, Qodiri, who are incorporating the principles of renewal in the art of speech into the literary process, and shows their impact on the development of the field. In the articles of young critics, current problems are studied step by step and solutions are presented. AbdulhamidCholpon loves the translation of works by Pushkin, Gorky and Tolstoy. Says he learned a lot from them about the skill. Cholpon thinks about the theater, the script, the skill of the actors, and notes the shortcomings that hinder the development of the industry. It seeks to strengthen the propaganda work among the people to attract the audience to the theater, to attract them. The critic, who dreams of the nation's knowledge and enlightenment, thinks of ease and convenience in this way. He emphasizes the role of the press in the development of criticism.

AbdulhamidCholpon puts forward theoretical views on literary and artistic criticism. His meticulousness is evident in his deep understanding of the problem in every field. The main credo of AbdulhamidCholpon's critical activity was to raise literature to the level of the art of speech, to influence our hearts and minds through it in raising the spirituality of the people. The critic warns that a nation that values art will never perish. In Cholpon's critical activity, truthfulness, quick-wittedness, objectivity, zeal, is conspicuous. In the article "500 years" he praises the work of AlisherNavoi and recognizes the contribution of the thinker to world civilization. AbdulhamidCholponNavoi proposed to immortalize his personality and dreamed of naming the university and the city streets. It is courageous to think this way about great figures with courage in a critical moment. The wish of the critic came true and AlisherNavoi was glorified by his personal followers.

It is no exaggeration to say that Munaqqid's article "Adabiyot Nadir" shed light on its essence. "Literature literally cleanses the black mud that has soaked not only into our bodies, but into our blood, to soothe the souls of the dead, the dead, the dead, the wounded, and the pure water of enlightenment that washes away the filth of the sharp heart. We need it more than the water of a

cleansing spring,"he said. Clever followed the philosophy that critical literature is the life of the nation.

The power of the aesthetic influence of the artistic word is that it does not retreat with the beauty of expression. On the contrary, it essentially remains the beauty of life itself. The artistic word is to become a symbol of beauty in achieving a specific goal that the artist is pursuing. The art of the word is a criterion of beauty that evaluates the spiritual values reflected in these works of art, defining its philosophical aesthetic significance. A work of art is not a means of propaganda; it is a work of art, a phenomenon of beauty.

The concept of beauty in the aesthetics of literary criticism is determined by how much the work of art perfects and raises the spirit of the period, the spirituality of the nation, the consciousness and level of society. Artistic taste and aesthetic level are the main criteria that determine the value of a literary work. In the samples of art created during the independence, the principle of having different colors, praising national values, boldly expressing the truth, delicately depicting the human heart, looking at its deepest layers, describing the goodness in the heroic nature has increased.

The artist's talent is manifested in a thorough knowledge of the language, the ability to use artistically saturated words in place, to create vivid, figurative expressions through various visual means, to draw logical, coherent conclusions, to express a clear idea. The creators use the word sparingly and wisely. Squeeze sentences absorb a wide range of meanings. In the analysis of critical works, the critic uses a dense but deep expression, logically-coherent image, philosophical-aesthetic views.

The creative word is aimed not only at demonstrating the uniqueness of the style of use, mainly the melody and enthusiasm, but also to reflect the holistic view of the person, period, time. Fiction fully demonstrates the power of words. Human thought is directly influenced by the word, the word, to the heart. The essence of the artistically saturated word is understood during the reading and mastering of the work.

Begali Kasimov, HamidullaBoltaboev, UzokJurakulov made a worthy contribution to the science of nature. OzodSharafiddinov, NaimKarimov, SirojiddinAhmedov, SheraliTurdiev, DilmurodKuronov paid great attention to the study of astronomy. In research, the development of the artist's literary, critical views is examined in close connection with the process of formation of creative aesthetic principles, with the comparative analysis of his works. It also highlights the importance of the aesthetics of each artist in our cultural life today, the role of artistic thinking in the formation of new principles and criteria, the role of cultivating literary taste.

The creative experience and theoretical teachings of Abdullah Qadiri, AbdulhamidCholpon, and AbduraufFitrat are covered in harmony with world culture and art. It is argued that modern aesthetics is a new stage in Uzbek literature as a manifestation of enlightenment realism in the interpretation of human personality and social life. Critics have attached great importance to their views on artistic perfection, historical authenticity, and vitality in promoting the legacy of devotees who have highlighted the issue of social activism of art as the basis of national literature.

CONCLUSION

These artists pay special attention to the formation of the nation, the awakening of national consciousness, self-respect even in complex social conditions, the belief in the current process of globalization, the preservation of loyalty to the people. Systematic comments are made on the personality of the word artist, the history of creation of his works, art, and the psychology of artistic creation as a new direction of development. It is also shown that the literary, aesthetic, enlightenment, moral views of writers are analyzed as a whole process with the period, society and social reality. Critics' research on the mysteries of creativity, the weight of words, the art of artistic perception and expression, the method and possibilities of imagery play an important role in raising the field of literary criticism.

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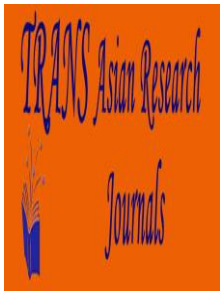

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ON THE ANALYSIS OF THE ASSOCIATIVE FIELD IN THE POETIC TEXT

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ABSTRACT

This article analyzes the associative units used in poems of the same name, explores the influence of linguistic and extra-linguistic factors in the emergence of these units, and explores the ability of creators to use individual associations. In linguistics, the interest in the study of the image of the external world in the psychological imagination of man and its reflection gave rise to associative linguistics. A.Nurmonov, Sh.Safarov, D.Khudoyberganova, I.Azimova, N.Hoshimova commented on this issue in Uzbek linguistics. Professor D. Lutfullayeva conducted in-depth research on the linguistic nature of associative units, their classification and their role in the formation of the text.

KEYWORDS: *Associative Analysis, Associative Unity, Stimulus, Response, Poetic Text, Basic Unity, Linguistic Factor, Extra-Linguistic Factor, General Association, Individual Association, Creative Thinking.*

INTRODUCTION

Today, with the development of science, new fields, new centers of research are emerging. Evidence of this can be seen in the field of modern linguistics. In particular, cognitive linguistics, pragmatic linguistics, linguo-culturology, anthropocentric linguistics. It can be said that all of these directions have taken a new approach to language, aiming to study the language together with the person who makes it real, and thus the features of the language have become even clearer.

In linguistics, the interest in the study of the image of the external world in the psychological imagination of man and its reflection gave rise to associative linguistics. A.Nurmonov, Sh.Safarov, D.Khudoyberganova, I.Azimova, N.Hoshimova commented on this issue in Uzbek linguistics. Professor D. Lutfullayeva conducted in-depth research on the linguistic nature of

associative units, their classification and their role in the formation of the text [1, p. 140; 2, p. 376; 3, p. 240].

THE MAIN FINDINGS AND RESULTS

N.B.Krushevsky explains the associative attitude as follows:"Any similarity is associated with other words according to the sign; this similarity is reflected in our minds not only externally, phonologically, morphologically, but also internally, semantically, it will be able to provoke other similar words and move with them"[1, p. 31]. When we hear or see a word (stimulus), certain units involuntarily begin to remind each other. This "reminder" process is the basis for the emergence of associative units.

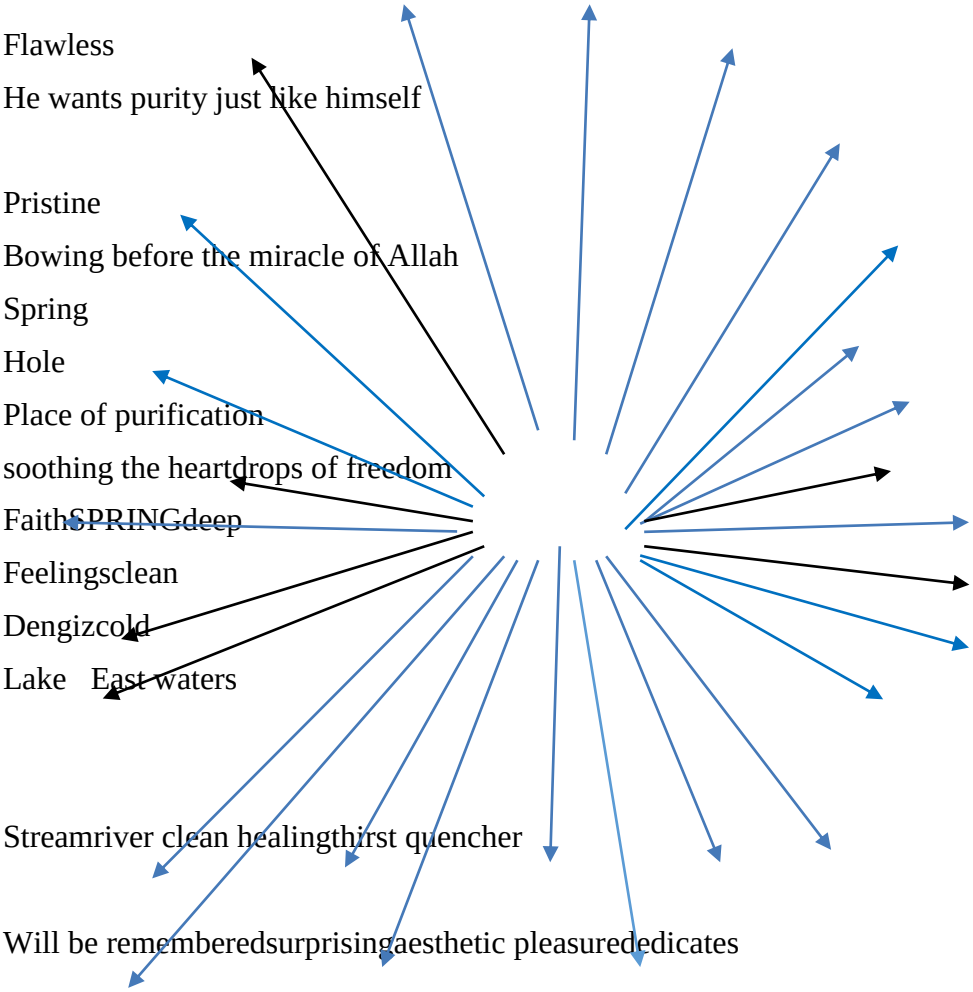
We experimented in a small experiment with what associative units the word *spring* can interact with in people's minds (the experiment was conducted with students of philological education) and found that it has a paradigm of the following units:pure water (7 times), clear water (6), thirst-quenching (4), pure, spotless (3), purity (2), spring, carved, large, clear, cold, deep, eastern waters, a place of purity, healing, transparent, river, stream, lake, sea, ocean, drops of longing for freedom, the miracle of Allah, soothing the soul, wants purity just like itself, feelings, faith, head before the creations of Allah bends, amazes, comes out naturally, stays in the memory, gives aesthetic pleasure.

In this experiment, the word spring stimulus was not repeated anywhere;word associations 18 (pure, spotless, purity, spring, carving, big, clear, cold, deep, healing, transparent, river, stream, lake, sea, ocean, feelings, faith); 9 associations in the form of phrases (pure water, clear water, thirst-quenching, eastern waters, a place of purity, drops of longing for freedom, the miracle of Allah, soothing the soul, bowing before the miracle of Allah); the associations in the form of speech are 5 (surprising, natural, memorable, gives aesthetic pleasure, wants purity just like itself).

The relationship of these units to the word spring stimulus is different. In particular, the associations of pure, spotless, clean, transparent, *clear, cold, healing, revealed* the relationship of the object and its sign. The lexemes of *river, sea, lake,* and *stream* formed a paradigmatic relationship with the word spring. Words and phrases that q*uench thirst, satisfy thirst, give aesthetic pleasure, amaze, remain in the memory, and soothe the soul, while the drops of longing for freedom, purity, faith, and emotions reflect an analogous attitude,* formed a cause-and-effect relationship with the word. The combination of fr*esh water, clear water, and eastern water* created a whole-part relationship with the word stimulus. *Bowing before the miracle of Allah* has always expressed man's individual attitude to reality.

The relationship of the units of the associative field in the experiment can be described in the diagram as follows:

Comes out naturallyclean water clean water



Literature is the artistic realization of language. All the magic, charm, and even the nuances of a language are reflected in a work of art created in that language. Therefore, we have observed the relationship of associative units in the two creatures below.

First, we analyzed the poem “Spring” by E.Vakhidov:

BuloqonaYersiynasidan
She’rsingariqaynaboqadi.
Suvningkumushoyinasidan
Mehrimbo`libquyoshboqadi,
To`yibichdim, suvbilango`yo
Dilgasingdi yurt muhabbati,
Tashnaligimqondi-yu, ammo
Yana ortdiqalbharorati[5,18].

The spring is from Mother Earth

It flows like a poem.

From the silver mirror of water

The sun feeds kindly.

I drank to my heart's content, as if with water

The love of the country is in my heart.

I'm thirsty, though

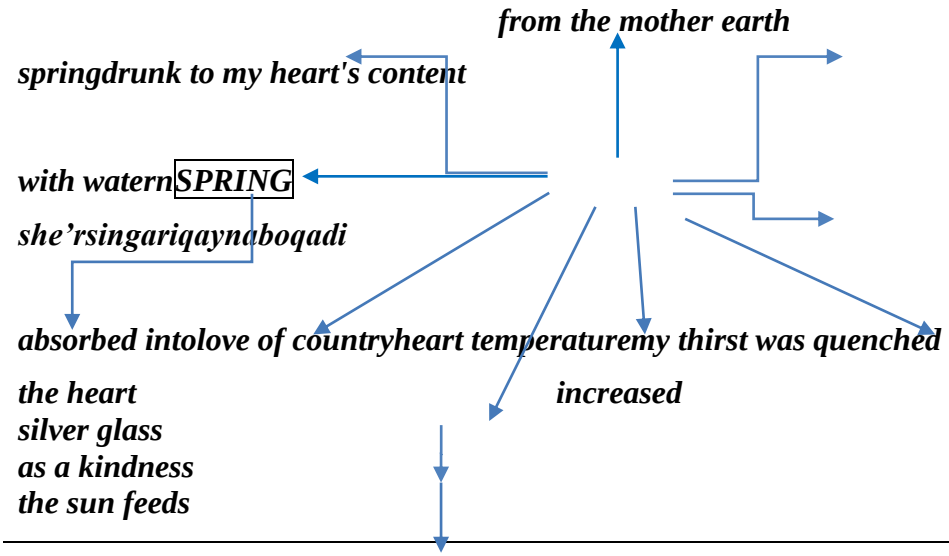
Increased heart temperature.

Associations in the text of the poem: units such as earthly, boiling like a poem, water, silver glass, lovingly nourishing the sun, satiating, satiating, sinking into the heart, love of country, thirst, bleeding, warmth of heart with the lexeme of spring associatively linked. These stimuli are combined into the associative field of the word.

The associative units in the poem are formed in connection with both linguistic and extra-linguistic factors. In particular, the stimulus forms a whole-part relationship with the word *water* lexeme. The *spring-water* confluence is also associated with the sign of mutual vital necessity, because without water, there is no spring: water is necessary for the emergence of a spring. The combination of *silver glass* revealed the relationship between the object and its sign. An example of an association based on spatial connection is *the union of the mother earth*.*Drinking* is a person's attitude to reality, an association based on desires; *boiling flow* depending on the activity and the object; and the accumulation of *blood in my thirst* gave rise to an association based on a cause-and-effect relationship. In addition, the units *that flow like a poem* (the spring boils like a poem), *the love of the land that flows into the heart* (the entry of spring water into the body is like the absorption of love of the country into the heart) are associative in their relationship to the nucleus.

While the above associative units formed a direct association with the word stimulus, *the sun-loving unit*, which is affectionate, entered into an indirect associative relationship.

The relationship of the units of associative space in the poem can be illustrated as follows:



In the work of the poet and in the minds of human society, we have seen what associations the word spring creates. Based on the above analysis, the following units can be cited as common members of both associative areas: *water, thirst quencher (quenches my thirst*). So, these concepts are general concepts that enter into an associative relationship with the word spring stimulus.

In A. Aripov's poem of the same name, we witnessed the following scene:

Qutlug` birsahardako`zochdibuloq,

Yo`l soldi daryolar sari adashib.

Ungarahmetmoqchiodamlarshuchoq,

Tog`-u toshlararoyaqinyo`lochib.

Odamlar, tegmangiz, mayli, toshsin u,

Mayliga, tog`ni ham ko`rsinyo`lida.

Qo`ying, o`zyo`linio`zitopsin u,

Zavqlanolsin u ham kurashso`ngida[6, 39].

Kutlug opened his eyes one morning,

He lost his way to the rivers.

People who want to feel sorry for him then

It opens a close path between mountains and rocks.

People, don't touch it, andlet's throw it,

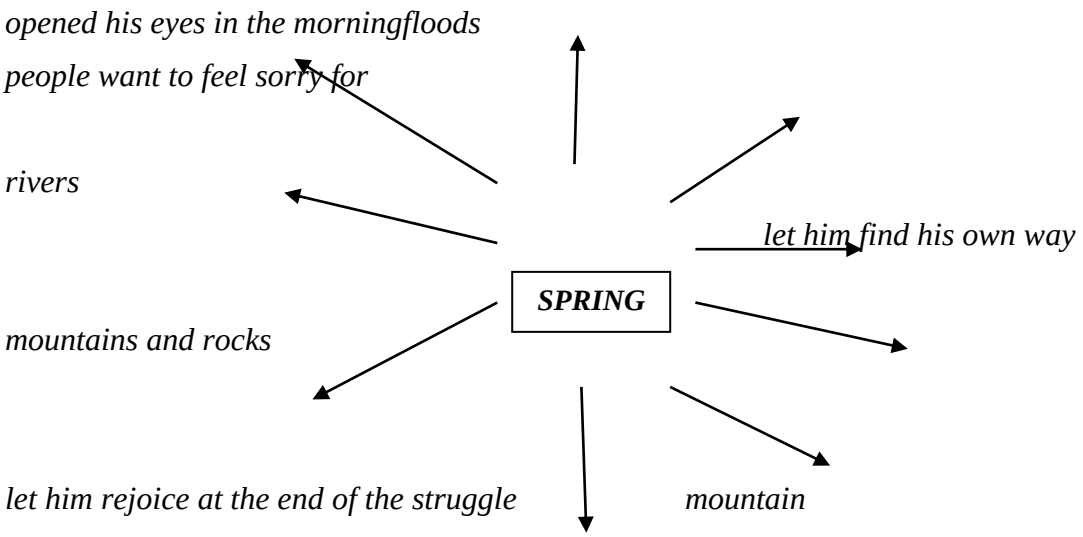
May he see the mountain on his way?

Let him find his own way,

Enjoy it at the end of the fight

As we can see, the poem is symbolic and rich in movement. Through the symbol of the spring, the poet describes the life of a person from birth to the end of his life. There are many obstacles and difficulties in a person's life, and in these obstacles, someone helps him, and when he achieves his aspirations, he enjoys it.

Associations in the text of the poem: *opened his eyes in the morning, rivers, led the way, people want to have mercy, mountains and stones, opened the way, let the stone, the mountain, find its own way;* the units formed an association with the word stimulus, as if to be enjoyed at the end of the struggle. The units of associative space in a poem can be expressed in the diagram as follows:



The unity of the eye in this poem is an example of an association based on the interconnectedness of objects in time. The *spatial-mountain* association was formed by a spatial-mountain association. If the unity of *human compassion reveals* man's attitude to reality, then the spring is the way, the spring is the association based on the connection between activity and object; *the unity of enjoyment at the end of the struggle reflected an association* based on a cause-and-effect relationship between subjects.

Drawing on the poems of ErkinVahidov and Abdulla Aripov of the same name ("spring"), we note that in the work of E. Vahidov the responses of the *spring* stimulus are used in their own sense, and in the work of Abdulla Aripov the associative units are completely symbolic (the main reason for this is that the text of the poem itself is symbolic). Although the factors in the formation of associations in both poems are similar, the content is approached differently. Both poems reflect the unique style and direction of the poets. According to Freud, associations of words can be not only related to the situation, but also to the effect, the process of inner emotion [4, p. 67]. Therefore, we also encounter various individual associations in the structure of the associative field. In the experiment, such combinations as "*God's miracle*", "*bowing before the creatures*" highlighted the beliefs of the speaker, while in the work of E.Vakhidov flo*wed like a poem, the love of the country in the heart,* in the work of A.Oripov he *opened his eyes in the morning, let him find his way, let him enjoy the end of the struggle*. The associations he formed with his units directly revealed professional individuality. That is, each person has a personal, individual attitude to the stimulus, in addition to the general associations.

CONCLUSION

As K.G. Jung points out, associative experience not only reveals the different meanings of the word stimulus, but also determines a person's personality [4, 82]. Based on such analysis, we can get information about the attitude of artists to reality, the scale of its thinking. Thus, in the formation of the poetic text, verbal associations, which are the products of the artist's associative thinking, participate as basic units. The analysis of associative units used in the poetic text also

allows us to draw conclusions about the perception of reality by the creators, how they perceive it, the ability to use language units in the text.

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APPLICATION OF CARBOPHOS IN THE CONTROL OF PLANT SPIDERS IN BUKHARA REGION

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ABSTRACT

One of the most important and highly effective factors in the technology of cultivation of agricultural crops is the protection of these plants from pests, diseases and weeds. The present paper is about the application of carbophos in the control of plant spiders in Bukhara region.

KEYWORDS: *Tetruychusurmal Koch, Spider, Cotton Plant, Fruit Trees and Shrubs, Omayt, Carbophos, Agriculture, Avtomax, Yield, Hectare.*

INTRODUCTION

In the economic development of agriculture, it is important to increase the productivity of cotton plants by selecting and planting high-yielding varieties that are resistant to pests, diseases and weeds [1, 2, 5].

THE MAIN FINDINGS AND RESULTS

Among the pests that damage the cotton plant, the most dangerous is the spider, the biology of which has been extensively and comprehensively studied [6,7]. In Bukhara region, spiders also damage cotton, reducing cotton yields by 20-25%. The main purpose of our experiments is to determine the timing of spider damage to cotton, to develop measures to combat it and to introduce them to regional farms. The spider infects more than 248 plant species, including 173 weeds and ornamental plants, and 38 fruit trees and shrubs.

Tetruychusurmal Koch is the most common spider in cotton-growing areas, killing an average of 35-40% of the cotton crop.

According to F.M.Uspensky [3.4], spiders reduce cotton yields by 50-60% if no protective measures are taken when they fall on cotton in June and by 2-6% if they fall in August.

On average, if there are 150 spiders per 100 leaves, it is recommended to protect them with chemicals during this period.

For the active movement of the spider, the temperature should be 25-30 ^{0}C and the relative humidity should be 45-65%. The female of the spider lives up to 30 days and lays 200 or more eggs. The spider lives in weeds in early spring. They are 20-30 times more common in roadside weeds than in other areas [6,7].

During 2020-2021, an experiment was conducted at the Khumin mahalla of Jondor district of Bukhara region, at the farm "Urin-Bahron-Bekzod". As a result of our experiments on ancient irrigated meadow-alluvial lands on the farm, it became clear that the spider was found in the cotton plant in late April and early May, with 14-15 pieces per 100 cotton leaves. In order to study the effectiveness of the drug "Carbophos" in the control of spiders in cotton plants, the following variants were experimented with 50%.

1. Control (with water);

2. Omayt 1.5l / ha (57% concentrate emulsion) comparator;

3. Carbophos 1.2 l / ha (50% concentrate emulsion);

4. Carbophos 1.7l / ha (50% concentrate emulsion);

The Bukhara-6 cotton variety was used in the experiment. There are 3 replants in the area of 100 m^2; cotton seedlings are located at a thickness of 91-95 thousand pieces per 1 hectare.

2020-2021 On the morning of July 14-15, using a rentomoy machine "Avtomax" sprayed the cotton plant with a working fluid at a rate of 600l / ha. Scientific observations and specific studies have been conducted to study the effectiveness of the drug used against spiders.

TABLE 1 THE EFFECTIVENESS OF THE DRUG "CARBOPHOS" IN THE FIGHT AGAINST COTTON SPIDERS (AVERAGE FOR 2020-2021)

Experimentoptions	Consumption drug rate l / ga	The average number of spiders per leaf.				Efficiencybetweendays, in%		
		untilprocessed15.07.	Daysafterprocessing					
			3	7	14	3	7	14
1. Control (withwater)	0	61.8	65.0	100.0	1.7	-	-	-
2. Omayt 57% k.em. comparator	1.5	42.0	1.5	0.8	1.0	96.5	98.1	50.0
3. Carbophos 1.2 l / ha 50% k.em.	1.2	75.0	3.0	1.8	0.5	96.0	97.6	99.6
3. Carbophos	1.7	38.0	15.0	2.5	0.8	60.6	94.5	97.9

1.7 l / ha 50% k.em.								

From the data in Table 1, it was found that after 7 days of chemical control of spiders, these drugs showed their effect in reducing the number of spiders, and after 14 days, their amount decreased to 99.6%. The variant used by Omayt also reduced the number of spiders, but due to the sulfur content of this drug, the farm of Khumin mahalla of Jondor district did not last long due to low soil and climatic conditions, high air temperature and lost its effect on crop storage. .
The results of the experiments showed that the carbophos used was 50% k.em., the drug had a long-term effect on the cotton plant, protecting it from spiders and increasing the yield of cotton (Table 2).

TABLE 2 THE EFFECT OF THE DRUG "CARBOPHOS" ON THE YIELD IN THE FIGHT AGAINST COTTON SPIDERS

Options	The rate of drugs consumed, l / ha	2020йил		2021йил	
		Productivity, ts/ ha	Additionalyieldts / ha	productivityts / ha	additionalyieldts / ha
1. Control (withwater)	-	30.5	-	28.8	-
2. Omayt 57% k.em. comparator	1.5	34.8	4.3	32.5	3.7
3.Carbophos 1.2 l / ha 50% k.em.	1.2	36.6	5.5	34.5	5.7
3.Carbophos 1.7 l / ha 50% k.em.	1.7	35.3	4.8	34.0	5.2

The results in Table 2 show that the number of pests per leaf in the control variant was 63.3-70.1 at the end of the year in the control variant of Khumin MFY farm of Jondor district, and the spider completely disappeared in the variants using chemicals, especially "Carbofos".

According to the options, when maintaining the yield of "Carbofos" at a dose of 1.2-1.7l / ha, an additional yield of 4.8 to 5.7 ts / ha of cotton was achieved, which ultimately led to high economic efficiency.

CONCLUSION

Also, the application of "Carbofos" against spiders in the amount of 1.2-1.7 l / ha in cotton plants grown in the Bukhara oasis, has a positive effect on plant growth and development in alluvial soils, which have long been irrigated; it was possible to get 34-36 quintals per hectare, and the additional yield was 4.8-5.7 quintals / ha.

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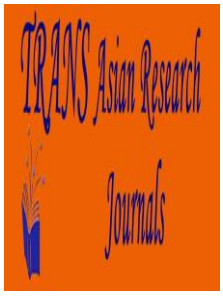

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COMPARISON BETWEEN BUG FINDING TOOLS WITH REVIEWS AND TESTING

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ABSTRACT

Because many vital systems depend on software, software failures may have huge implications in terms of endangering people's health as well as causing financial loss. Furthermore, as software gets more sophisticated, preventing errors becomes progressively more challenging. Using automated static analysis, bug detection programs may detect flaws in software source code. Other testing as well as review processes may take less time as a result of this automation. To do so, we must first understand how the flaws discovered by bug detecting tools connect to the problems discovered by other methods. This article presents a case study in which various initiatives, mostly from the industrial sector, were utilized to analyze interrelationships. The primary result is that bug detecting techniques mostly identify flaws that are not identified by testing; however a subgroup of defects that are found by reviews. The kinds that can be identified, on the other hand, are examined in more depth. As a result, if the large rate of false positives from the instruments can be accepted, a combination is the best option.

KEYWORDS: *Bug, Defect-Detection, False Positives,Software.*

1. INTRODUCTION

Software quality assurance already takes up almost half of such development cycles[1]. As a result, it's critical to enhance defect-detection methods while also lowering their prices. Automation may be a viable solution in this regard. Automated test-case creation based on executable models, for example, is being investigated as a way to improve testing efficiency[2]. Bug detection tools have been used to do extensive study on identifying flaws in code using automated static analysis.

Despite the fact that research into the issue is continuing, there are few studies on how these tools interact with one another and with other well-established defect-detection methods such as

testing and reviews. We'll now go through the issue scenario in more depth. In the following, we define the words we use briefly: Failures are perceived deviations in output values from anticipated values, while errors in code or any other documents are the source of failures. Both of these things are referred regarded as flaws. When there are no failures involved, such as with faults linked to maintenance, we primarily utilize defect in our analysis. Problem[3]. We look at how automated dynamic analysis using bug detecting tools compares to other kinds of defect-detection methods and if it's feasible to decrease defect-detection work by utilizing such tools.

Other kinds of defects, such as logical errors or incorrect function results, are not detectable by bug detecting techniques. These flaws, on the other hand, may be discovered during a software testing through following test cases. In conclusion, the review outperforms bug detecting techniques since it can identify much more fault kinds. However, it does seem to be advantageous to use a bug detecting tool first before examining the code, since this ensures that any flaws discovered by both have already been fixed. Because it is automated, it is less expensive and more comprehensive than a human evaluation. However, we have seen that all tools have a large proportion of false positives. This leads in considerable non-productive labor for the engineers, which may outweigh the benefits of automation in certain instances[4].

This is broken down into three questions.

- Which methods are used to detect which kinds and classifications of defects?
- Is there really any overlap amongst the faults discovered?
- What is the percentage of false positives generated by the tools?

The following is a summary of the major results.

- Bug-finding software only detects a portion of the fault kinds that may be discovered via a review.
- The kinds of flaws that the tools can detect can be examined more extensively, implying that the technologies are better at detecting the bug patterns for which they were designed.
- Unlike issue detecting tools, dynamic tests discover flaws in a totally different way.
- Bug detection software has a high rate of false positives.
- In various projects, the bug-finding tools provide significantly varied outcomes.

There are four main implications from the findings.

- Bug detection tools cannot replace dynamic tests or inspections since they discover much more and varied kinds of defects.
- Because certain problems do not need to be manually identified, bug detecting programs may be a suitable pre-stage to a review. One option is to highlight faulty code so that it is not missed during the review.
- If the false positives rates of bug detecting techniques can be decreased, they may offer a substantial reduction in the work required for defect identification. According to our case studies, the existing ratios are not yet fully acceptable.
- To deliver more consistent outcomes across projects, the tools must be more forgiving of programming style and design.

1.1.Testing vs. Bug Detection Tools

For system testing the program, we utilized both black box and white box tests, as well as some unit tests. The black box tests were based on the testers' experience and the written requirements. Equivalence and boundary testing were employed as standard methods. Source code and path testing were used to create the white box tests. Several hundred test cases were created and performed in total. The quality of the test suites was also checked using a coverage tool. There were no stress tests, however, which might have skewed the findings considerably. Defects were identified only in the projects EStA and C[5]. The other projects are probably too advanced for regular system testing to discover any further flaws.

The flaws discovered during testing are divided into three categories: application failure, logical failure, and insufficient error handling. According to the defect analysis above, bug detecting tools are more likely to discover flaws in the area of code maintainability. As a result, dynamic testing methods uncover a wide range of problems. There were no similar flaws identified using testing or bug finding techniques for the software systems for which faults were discovered. Furthermore, the tools identified a number of flaws in the systems that the tests were unable to detect. These are flaws that can only be discovered via lengthy stress testing, such as open database connections. If the system is under heavy load and there are a large number of open database connections, this may only lead to performance issues or possibly application failure. The majority of faults, on the other hand, are related to maintainability and therefore are not detected by dynamic testing. In conclusion, various flaws are detected using dynamic tests and bug detecting tools. Bug finding tools are excellent at identifying flaws linked to maintainability, whereas dynamic testing is effective at finding logical problems that are best apparent while running the program. As a result, we advise utilizing both methods in a project.

1.2.Bug- Detecting Software

Bug detecting tools are a kind of software that, like a compiler, uses static analysis to identify bugs in code. However, the findings of such a tool are not necessarily true faults, but they may be interpreted as a warning that a section of code is important in some manner. Identifying such important code parts may be done using a variety of methods. One of the most popular is to identify common bug patterns based on experience and to disclose common hazards in a programming language. Additionally, coding rules and standards may be reviewed to improve readability. In addition, more advanced analytic methods based on dataflow and control flow are used. Finally, some technologies provide extra annotations in the code to enable for expanded static inspection and a conjunction with model checking[6].

1.3.Analyzed Methods:

The following are descriptions of the three bug detecting technologies that we utilized for the comparison. Because the projects we examined, as detailed below, are all written in Java, we only consider tools that analyze Java programs. All three tools are free to use and distribute under an open source license. These three tools were chosen to illustrate tools that primarily utilize bug patterns, code standards, and dataflow analysis. We purposefully excluded technologies that need code annotations since they have quite distinct features. FindBugs is a program created at the University of Maryland that uses a collection of bug patterns to identify possibly problematic code snippets. It may detect errors like as null-pointer dereferencing and unused variables. It also utilizes dataflow analysis to some degree for this.

We analyze the interrelationships between the flaws discovered by bug detecting tools, reviews, and tests using the software from the five projects. To do so, we used each of these methods as much as feasible to each piece of software. While only project C was reviewed, all other projects were subjected to black-box and white-box testing. We ran the bug-finding programs with great care so that we could compare them. We also examined each warning from the bug detecting tools to see whether there was a genuine fault in the code to get a better comparison with the other methods. This was accomplished by having experienced developers examine the appropriate code sections. The methods were used independently, meaning that the testing and review were not influenced by the findings of the issue detection tools. In this case study, the external validity is low.

We only looked at five systems, despite the fact that we mainly looked at commercially produced software that is in use. More trials are required for improved results. Furthermore, the testing on more mature systems, that is, those that are currently in use, revealed few flaws. This may restrict the applicability. Furthermore, data from a single review is not typical and may only provide a preliminary impression.Finally, we only looked at three bug detection programs, all of which are currently under development. If other tools had been used, the findings could have been different. All of the warnings produced by the bug detecting tools are referred to as positives in the following. True positives are warnings that are proven to be code flaws, whereas false positives are incorrectly identified issues.

1.4.Categorization of Defects

We utilize a five-step classification of the faults based on their severity for the comparison. As a result, the faults are classified based on their consequences rather than their source or kind of occurrence in the code. We utilize a standard severity classification that has been significantly modified to fit the faults identified in the projects. Category 1 defects are the most severe, while category 5 defects are the least severe. The following are the categories:

- Defects that cause the application to crash. These are the most serious flaws, which prevent the whole program from responding to any user input.
- Errors that result in a logical failure. This category includes any flaws that cause the program to fail logically but not crash, such as an incorrect result value.
- Defects caused by a lack of error handling. Minor flaws in this category do not crash the program or cause logical problems, but they are not addressed correctly.
- Defects that go against organized programming concepts. These are flaws that usually have no effect on the program but may cause performance bottlenecks and other issues.
- Defects that make the code less maintainable. All faults that solely impact the software's readability or changeability fall under this category. This categorization allows us to evaluate and contrast different defect-detection methods based on the degree of faults found and the kinds of defects found.

1.5.Efficacy of Defect Removal

According to Jones, defect elimination effectiveness is the percentage of all faults identified by a particular defect-detection method[7]. The major issue with this measure is that it is impossible to determine the entire number of faults. As an estimate for this amount, we take the total of all distinct faults identified by all methods under consideration in our case study. Tab. 5 displays the

findings. According to the metric, tools are the most efficient methods, whereas tests are the least efficient. However, we must also consider defect classification, since this has a major impact on the image. It is clear that tests and reviews are much more effective at detecting category flaws than bug finding methods, which are the most serious errors.

2. REVIEW OF THE LITERATURE

Only a few research has been done on how bug detecting methods interact with one another and with other well-established defect-detection approaches like testing and reviews[8]. PMD and Find Bugs, for example, are contrasted in based on their warnings, which were not entirely verified for false positives. The results show that, although there is some overlap, the tools' cautions are largely different. With our statistics, we can back up this conclusion.

Engler and Musuvathi compare and contrast their bug detection tool with model checking methods. They argue that static analysis can examine greater quantities of code and discover more errors, while model checking can verify the code's implications, not simply its surface characteristics. A static analysis tool for C code is described in[9]. According to the authors, thorough examination of pointers, for example, results in much fewer false positives than basic syntactical tests. It describes an intriguing mix of static analysis tools and testing. It is suggested that static analysis be used to identify possible issues and that test cases be generated automatically to check whether there is a genuine fault. The strategy, on the other hand, is clearly ineffective when it comes to maintenance-related issues.

Bush et al. provide a static analyzer for C and C++ code that may detect a number of additional dynamic programming problems[10]. A comparison with testing, however, was not carried out. Nonetheless, this study backs up our view that defect-finding skills are significantly influenced by programmers' coding approaches. A comparison of static analysis tools for C code in terms of buffer overflows is given in. The faults were inserted, and the percentage of buffer overflows discovered with each method was calculated. It's also worth noting that the number of false positives or false alarms is alarmingly high. Palsberg presents several bug-finding techniques based on type-based analysis in [11]. He demonstrates that they can identify race situations and memory leaks in software.

3. DISCUSSION

The fact that bug detecting techniques mostly identify problems related to code maintainability is consistent with what an experienced developer would anticipate. Only specific patterns in the code, as well as basic dataflow and control flow characteristics, may be found using static analysis. As a result, only reviews or tests can validate the software's logic (as long as the static analysis is not linked with model checking techniques). In that sense, the tools do not "understand" the code. The most obvious example is the changing efficiency of initiatives. In many instances, the tools failed to recognize that some database connections are not terminated in the same Java method as others, but in a separate one.

They just look for a certain pattern. As a result, static analysis techniques are limited by what may be expressed by bug patterns, or by how excellent and general the patterns can be. However, there isn't a single overlapping fault identified by bug detecting tools or dynamic tests, which is unexpected. On the plus side, this means the two methods are completely complimentary and may be used in tandem to great effect. On the downside, utilizing the automated static analysis methods we discussed may not allow us to minimize expensive testing efforts. The fact that the

tools are mostly used to identify maintenance-related problems explains why there is so little overlap. However, one would anticipate at least some of the flaws discovered by the tests to be identified by the tools, particularly in the areas of dataflow and control flow. The fact that most of the projects examined are very mature, and several of them are already in operation, explains the study's unfavorable findings. As a consequence, only a limited number of flaws were discovered during testing, which may explain the absence of overlapping.

The large percentage of false positives generated by the tools is a very disappointing finding. The anticipated advantage of utilizing such technologies to automate fault detection is that it will need less human involvement. However, since two-thirds of all warnings are false positives, the human work required when utilizing bug detecting techniques may be much more because each warning must be reviewed to determine its significance. Despite the considerable variations across the instruments, selecting the optimal mix of tools may still be beneficial. Given the overlap of flaws with other methods and the false positives ratio, bug finding tools that utilize extra annotations in the code for defect identification may be helpful. The annotations enable the tool to comprehend the code to a certain degree, allowing for certain logic tests. This increased understanding of the code may help to decrease the number of false positives. The annotations, on the other hand, need extra work on the part of the developers. It must be determined whether or not this endeavor is profitable. In this research, the effort and expense of determining faults using the tools (including screening for false positives) were not assessed.

4. CONCLUSION

The work provided is not a complete empirical research, but rather a case study based on a number of projects, mostly from the industrial sector, that provides preliminary evidence of how bug detecting tools connect to other defect detection methods. The primary results were that bug detecting techniques showed entirely different problems than dynamic tests, but only a subset of the review kinds. The defect categories identified by the tools are examined in more depth than those detected through reviews. The efficacy of the tools seems to be highly dependent on the individual programming style and software architecture, since the outcomes varied greatly from project to project. Finally, if the number of false positives is minimal, combining the use of issue detecting tools with reviews and tests would be the best option. The time spent resolving a false positive is likely more than the time saved by utilizing the tools. As a result, the primary conclusion is that bug detecting tools, when used in conjunction with other defect-detection methods, may save money if tool developers can improve the tools' false positive rate and tolerance for various programming styles.

This research is just a first hint, and further empirical confirmation is required before strong conclusions can be drawn. We want to replicate the research on other topics and with alternative tools, such as commercial tools or tools that utilize extra annotations in the source code. Because we just looked at web apps in this research, it's also essential to look at other kinds of software. More study is needed to figure out how to combine the many methods in the best way possible. To compare bug detecting methods with other approaches, more reliability-oriented metrics, such as failure intensity efficiency [19, 20], may be employed as a first step. This may provide additional information about the impact of bug detecting tool use on the dependability of the system.

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WIRELESS MESH NETWORKING WITH XBEE AND ZIGBEE

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ABSTRACT

Digi XBee is the brand name of a popular family of form factor compatible wireless connectivity modules from Digi International. The first XBee modules were introduced under the MaxStream brand in 2005We perform a performance evaluation of ZigBee mesh networks based on XBeemodules, in terms of packet delay and received signal strength (RSSI). The XBee radios can all be used with the minimum number of connections — power (3.3 V), ground, data in and data out (UART), with other recommended lines being Reset and Sleep. We evaluate the performance for both line-of-sight (LOS) and non-line-of-sight (NLOS) environments in buildings and a parking lot. The results of our study are useful for building wireless sensor networks and communication networks of mobile robots where the communication distances between nodes are greater than the single-hop range and hence communication between nodes requires multi-hop transmissions.

KEYWORDS: *Mesh Network, Wireless, Xbee, Zigbee.*

1. INTRODUCTION

Nowadays, many wireless communication networks are being developed and deployed rapidly, including some of the Wireless Personal Area Networks (WPANs) which are the wireless networks for short ranges. The IEEE categorizes WPANs into two standards: IEEE 802.15.3a for high-speed WPAN and IEEE 802.15.4 or Zigbee for low-speed WPAN. In this paper, we consider a performance evaluation of Zigbee networks. Zigbee is a standard that defines a set of communication protocols for low-data-rate short-range wireless networking. Zigbee-based wireless devices operate in 868 MHz, 915 MHz or 2.4GHz frequency bands. The maximum data rate is 250 kbps. ZigBee uses DSSS (Direct Sequence Spread Spectrum) which divides the 2.402 to 2.480 GHz spectrum into 16 channels or 10 channels in the 915 MHz spectrum and 1 channel in the European 868 MHz spectrum[1].

XBee modules are available in three form-factors. All XBees, with the exception of the XBee 868LP, are available in the popular 20-pin through-hole form-factor. The latest XBee modules are also available in surface-mount and micro-mount form-factors, which are popular for high-volume applications due to the reduced manufacturing costs of SMT

- Through-Hole (TH)
- Surface Mount (SMT)
- Micro-Mount (MMT)

XBee modules typically come with several antenna options including U.FL, on-board chip, RF pad and integrated PCB. XBee modules can operate either in a transparent data mode or in a packet-based application programming interface (API) mode.

- Transparent mode: data coming into the Data IN (DIN) pin is directly transmitted over-the-air to the intended receiving radios without any modification. Incoming packets can either be directly addressed to one target (point-to-point) or broadcast to multiple targets (star). This mode is primarily used in instances where an existing protocol cannot tolerate changes to the data format. AT commands are used to control the radio's setting
- API mode: data is wrapped in a packet structure that allows for addressing, parameter setting and packet delivery feedback[2], including remote sensing and control of digital I/O and analog input pins.

The multiple access schemes is Carrier Sense Multiple Access/Collision Avoidance (CSMA/CA) similar to that used in IEEE 802.11. Zigbee is targeted for low-data-rate, low-cost, and battery-powered applications[3]. In many Zigbee applications, the total time that the wireless device is engaged in any type of activity is very limited; the device spends most of its time in a power-saving mode, called “sleep mode”. As a result, Zigbee-enabled devices are capable of being operational for several years before their batteries need to be replaced. In term of its networking capability, ZigBee provides several types of network topologies ranging from pointto-point, star, to mesh topologies[4].

Mesh networks are suitable for dynamic and large-area networks where nodes are far away from each other and communication between them require multi-hop transmissions and the nodes are dynamic (e.g., mobile) or there are high interference levels in the communication links so that nodes may be considered “active” or “inactive” from the network periodically[5]. There are many interesting applications requiring mesh networks, for example, in building and construction automation system, in logistics and grain storage, in swarm of robots, and in vision-based wireless sensor networks.

Given such various applications with wireless mesh networking, we are interested in building mesh networks using XBee modules which are ZigBee-compliant chips manufactured by Digi International, Inc. Our initial interest in Xbee is because XBee modules are inexpensive and widely available in Thailand. We are interested in building Xbee-based wireless mesh networks and studying the performance of the networks in term of delay and received signal strengths in the indoor and outdoor environment. The rest of the paper is organized as follows. In Section II, we give information related to wireless mesh networking with ZigBee/Xbee. Specifically, Section II discusses the types of devices and mesh topology. The experimental results are shown in Section III. Section IV summarizes the paper and discusses some future extension[3].

1.1.Zigbee Network Formations

Zigbee defines three different device types, which are coordinator, router and end device [10].

- Coordinator: Start a new PAN by selecting the channel and PAN ID, allow routers and end devices to join the PAN, transmit and receive RF data transmission, and route the data through the mesh network.
- Router - Transmit and receive RF data transmission, and route data packets through the network.
- End Device - Cannot assist in routing the data transmission but transmit or receive RF data transmission, and intended to be battery-powered devices.

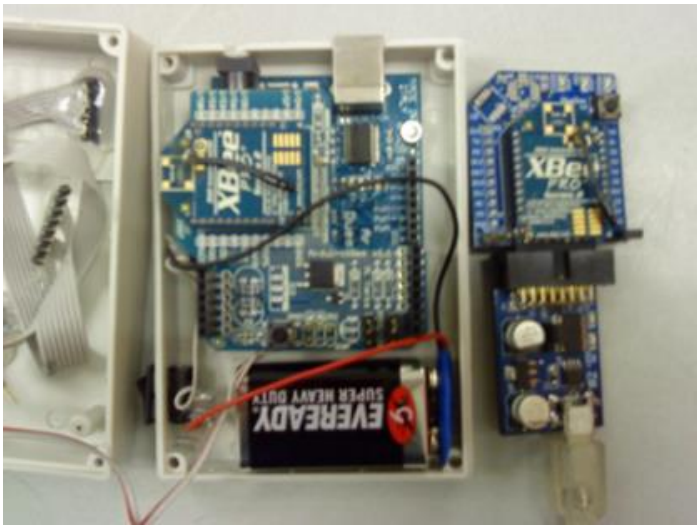

Figure 1: Xbee with Arduino (left) and BlueBee dongle (right)

- **Mesh Topology**

In general, Zigbee mesh topology consists of a coordinator and a set of routers and end devices [10]. A router can be linked to one or more routers and end devices. The communication rules of mesh topology are flexible because the routers that are located within range of each other can communicate directly. An advantage of mesh network is that there is likely another alternative route in case an existing link fails. Hence, this type of network topology is very reliable. Also this concept is applicable to wireless networks, wired networks, and software interaction. The example of mesh topology network is shown in Figure 1.

- **Building XBee Networks**

Building an XBee network is done automatically by Xbee devices. The Coordinator starts a ZigBee network by scanning for existing PANs in that area and for available channels. It then selects an unused PAN ID and a channel. From now on, a router or an end device can join a nearby Coordinator or another router that has already joined the PAN. If the router or end device is not being a part of the network, it performs a PAN scan of the SC channels and looks for the coordinator or router operating with the valid PAN ID. The router or end device scans the SC channel until the valid device is discovered. Then, it sends an association request frame to associate device and receives an association response to verify the allowance into the network. The joining router and end device then send a broadcast discovery frame to discover 64-bit

address of the Coordinator. Each router and Coordinator parents can allow up to 8 end device children to join their own device.

1.2.RSSI Measurement

RSSI (Received Signal Strength Indicator) is the signal level (in -dBm) of last good packet received. There are two ways to read RSSI value: 1) RSSI value is encoded into pulse-width modulated signal available at Pin 6 of the XBee module, and 2) RSSI value is read via an API command. The RSSI value reported by XBee Pro module is between -36 to -100 dBm while that of a standard Xbee module is between -23 to -92 dBm. However, the XBee manual says that the reported value is accurate between -40 dBm and the sensitivity of Xbee module's receiver [14]. However, we did not verify these numbers in our test.

- RSSI Measurement in a Parking Lot: In our experiment for RSSI measurement, we connect two XBee Pro modules (i.e., one node is a Coordinator and the other is a Router/End device) and then vary the distance between them to measure the relationship between RSSI values and distances. We make RSSI measurements in line-ofsight (LOS) and non-line-of-sight (NLOS) settings in a parking lot and in a building. The first results are measured from an SIIT parking lot. First, for the LOS setting we put two Xbee nodes into the vacant area that they can directly "see" each other. Second, for the NLOS setting we put the two nodes in a parking lot which has some obstructions from cars.
- RSSI Measurement in a Library: Another location that we measure the RSSI is a library at SIIT. We perform on RSSI measurements in NLOS setting, where we fix the position of the Xbee Coordinator node in one room and move the Router/End device node away from the Coordinator in to the room next to the Coordinator's room and measured the RSSI.

1.3.Packet Delay Measurement

To measure packet delay in XBee networks, we program the Arduino to send the "Hello World" sentence, which has the size of 10 Bytes. We send the sentence in every 5 seconds to the Coordinator and wait until the Coordinator responses back with an acknowledgment packet (ACK) back to the source. The packet delay in our experiments is defined to be the duration between sending a packet until its acknowledgment packet has been received by the source. This may be different from the standard definition of packet delay where a one-way delay from the source to destination is considered. Our delay is defined as the round-trip time (RTT) until an CK is received

Note that when a packet is transmitted from a source node to a destination node (possibly via multiple hops), a network-level acknowledgment is transmitted back from the destination node across the established route to the source node. This acknowledgment packet indicates to the source node that the data packet was received by the destination node. If a network acknowledgment is not received, the source node will re-transmit the data.

- Delay Measurement in Point-to-Point Link: We first perform a measurement of the packet delay in a point-to-point link. We connect an Xbee module that act as the Router/End device to the Arduino board which sends "Hello World" packets to the Coordinator, receives ACK packets from the Coordinator, and calculate the delay times. We observe the results of the delay time around 64 to 67 ms while the two Xbee modules is still able to communicate to each other until the nodes are out of range.

- Delay Measurement in Multi-Hop Networks: In the second experiment, the delay measurement is done in a dormitory building with three Xbee modules. We position the three modules

XBee® and Zigbee® have some commonalities and share a relationship. XBee is a family of radio modules and is a registered trademark of Digi International[6]. Zigbee is a wireless communications protocol and a registered trademark of the Zigbee Alliance. Many people confuse these two names because both are involved in radio networking and have "Bee" in their branding. But they are quite different. Let's compare XBee and Zigbee to get a better understanding of what they are, how they are different, and their relationship.

Zigbee is a wireless communications protocol for low-power, local area wireless mesh networking with modern security, that is standards-based, and operates on global frequencies. It's commonly used in home automation, smart energy, wireless sensing and industrial automation.

XBee is a brand name that refers to a family of devices from Digi International. Digi XBee radio modules share common form factors, a standard host interface, supporting tools and software, and a group of protocols to select from including Wi-Fi, LTE cellular, DigiMesh® as well as Zigbee. Therefore, there are XBee modules running the Zigbee protocol, but not every XBee is Zigbee, or vice versa.TheZigbee protocol is a standard, the same way that Bluetooth is a standard. Any manufacturer's device that fully supports Zigbee can communicate with any other company's Zigbee devices[7]. So just like a Beats Bluetooth headset made by Apple can connect with a Galaxy smartphone made by Samsung, any Zigbee light switch from G.E. can communicate with Zigbee lamps from Phillips, or with any other Zigbee-certified device.

How does this work? Well, just like a great cake, robust network protocols are all about layers. Each layer adds features and functionality with enough independence that implementation changes in one layer do not require changes in any of the others. Zigbee is a protocol layer that defines wireless networking stuff, like how to start a network, perform address resolutions and route packets. It also specifies how to implement certain applications, with predefined ways of communicating about things such as lighting control, managing smart energy systems, or environmental monitoring.

The layer below Zigbee supporting its advanced features is known as IEEE 802.15.4. This is a set of standards that define how the radio spectrum is utilized and many other operations that promote reliable transmissions. Digi's XBee brand radio modules can be configured with or without Zigbee. There's even a configuration that supports 802.15.4 directly in its native form[8].

Zigbee itself adds three important features:

- Mesh routing - uses routing tables that define how one radio can pass messages through a series of other radios along the way to their final destination.
- Ad hoc network creation - an automated process that creates an entire network of radios on the fly, without any human intervention.
- Self-healing mesh - a process that automatically figures out if one or more radios is missing from the network and reconfigures the network to repair any broken routes.

Every Zigbee network assigns different roles to the radio modules, or nodes. These include:

- **Coordinator**

This radio is responsible for forming the network, handing out addresses, and managing the other functions that define the network, secure it, and keep it healthy. Each network must be formed by a coordinator and there's never more than one coordinator in your network.

- **Router**

A router is a full-featured Zigbee node. It can join existing networks, send information, receive information, and route information. Routing means acting as a messenger for communications between other devices that are too far apart to convey information on their own. Routers are typically plugged into an electrical outlet because they must be turned on all the time. A Zigbee network generally has multiple router radios.

- **End Device**

End devices are essentially stripped-down versions of a router. They can join networks and send and receive information, but that's about it. They don't act as messengers between any other devices, so they can use less expensive hardware and can power themselves down intermittently, saving energy by going temporarily into a nonresponsive sleep mode. End devices always need a router or the coordinator to be their parent device to help them join the network, and to store messages when they are asleep. Zigbee networks may have any number of end devices.

Zigbee is a shared protocol, so chips and modules are available from many manufacturers. That standardization is a key part of its value. What makes Zigbee on Digi XBee special? First of all, Digi has created an excellent implementation, one with the highest quality of engineering and that is fully certified by the Zigbee Alliance for interoperability[9]. These essential basics are just the foundation.

A standardized host interface promotes fast and easy-to-understand configuration, control and communications[10]. The user can choose between simple human-readable AT commands, or a structured API that implements rock-solid machine-to-machine interactions. An assortment of module form factors mean that Digi XBee can fit into temporary sockets, or be permanently soldered to PCBs. These standard form factors include an extremely small Micro size that packs the power of XBee into a module no bigger than a fingernail[11].

Digi layers its TrustFence security framework onto the modules, including secure boot, secure identity and privacy. Each module is user-programmable, so application logic, sensor input, power management and more are supported without the need for any additional microcontrollers. Finally, there's the power of the Digi XBee ecosystem. If any part of the project needs to be moved to a different communications protocol in the future, there's no need to change module footprints, form factors, host interfaces or embedded programs. This makes changing between standards a breeze.

XBee radio frequency (RF) modules are produced by Digi International Inc. These modules make it easy and cost-effective to deploy wireless technology in electronic devices, especially those used on device networks for smart cities, precision agriculture, industrial automation, sensor networks, medical devices and asset tracking applications[1].

2. DISCUSSION

Digi XBee 3.0 modules are configurable, with one module supporting multiple protocols, including Zigbee, Wi-Fi, Bluetooth, 802.15.4, DigiMesh, 868 MHz, 900 MHz, Cellular LTE Cat 1, LTE-M and NB-IoT. All Digi XBee modules support a common command language and communications interface, so switching between protocols is easy, and can often be accomplished with no physical or logical changes at all. This flexibility lowers manufacturing and engineering costs, and offers OEMs the ability to quickly expand their roadmap. All XBee modules share a common pin layout and are available in compatible footprints. Digi XBee modules are available in three form-factors: through-hole, surface mount and Micro surface mount, each with a choice of antenna options.

Digi XBee modules are pre-certified in multiple regions, enabling developers to get to market quickly at lower cost. Digi XBee devices can be monitored, managed and updated with Digi Remote Manager®, which enables mass firmware updates, automation, alerts and reporting from a dashboard. Digi XBee is part of a complete system of pre-certified, programmable wireless modules, as well as gateways, adapters and software — all engineered to accelerate wireless development for global deployments.The Digi XBee ecosystem offers device developers a full range of rapidly deployable drop-in networking solutions for wireless communication between devices, adaptors and gateways. One socket allows you to connect to device networks around the globe. You can future-proof your design and know you'll be covered for new wireless technologies as they emerge.

3. CONCLUSION

This paper reports our initial study of Xbee-based wireless mesh networks. We evaluate two main performance parameters: the received signal strength (RSSI) and the round-trip packet delay. We measure a relationship between RSSI and distance for a point-to-point link in both line-of-sight (LOS) and non-line-of-sight (NLOS) environment. Next, we measure the packet delay in both star (single-hop) and mesh (multi-hop). The delay that we measure is the loopback or RTT delay for the ACK from the application sublayer. These delays vary little with the more number of hops. Hence, we could conclude that the main part of the delay is due to getting the ACK from the application layer. Future extensions of this work include an automatic monitoring of RSSI in real time systems, testing for battery consumption time, network life time, and measuring the parameters (RSSI and packet delay) in larger network settings. We also plan to include the mesh networking capability into the temperature monitoring system being developed in parallel by our colleague.

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RESEARCH OF MUHYI DIWAN SOURCES: TRADITIONAL COMPOSITION AND INDIVIDUALITY

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ABSTRACT

The article is a scientific and critical study of the Muhyidiwans of the poet MuhyiddinMuhammadrizoAkhundoglu, who lived and worked in the literary environment of Kokand in the second half of the XIX century and the beginning of the XX century. In this research, we have tried to study the diwans of the poet Muhyi according to the same rules.

KEYWORDS: *Diwans, Turkish Diwans, Persian Diwans, Kita (Fragment), Ghazals, High Ideological Content and Sophistication, Enlightenment, Science and Tradition.*

INTRODUCTION

From the creation of mankind to the present day, there is a composition of life based on the mutual reflection of the parts that define the way of life of each period. The fact that one compositional device gives way to another evolutionary device, the renewal and change of the unity of time and space, provides an increase in human life, living conditions, content. As Aristotle points out in his Poetics, “A whole is something that has a beginning, a middle, and an end. Genesis is not necessarily followed by something else, but something that follows or happens according to the law of nature: on the contrary, the end is due to necessity or, as a rule, something else that follows: then nothing happens. The middle itself is based on the fact that something else follows and something else comes after it” [Aristotle, p. 19]. This idea of the great Greek philosopher determines not only the composition of the beginning, development, and end of time and space, but also the structure of examples of fiction.

Hence, any work, according to Aristotle's definition, has a beginning, a middle, and an end. Of course, this definition is to some extent more relevant to works that prioritize the spirit of drama. Because small-scale works: poems, gazelles, kita (fragment)s, hens - especially in the literary genres typical of Oriental poetry, it manifests itself in the form of a more communicative composition. In the ghazal genre, which is the flower of Eastern poetry, the system of language,

the system of characters, moves in harmony with each other, and the core of meaning stops the movement of decoration through emotions, symbols. With this action, a semantic composition is created.

Literary scholar Yo.Isakov, in his work "Navoi Poetics", speaks about the structure of the ghazal genre and makes the following comments: However, each real poem has its own composition depending on its semantic structure.

It can be concluded from these considerations that composition in lyrical genres has characteristic features, but there is no single monolithic compositional device. Therefore, mainly in post-Islamic Arabic classical literature, the attempt to create a logical chain that complements each other by collecting, systematizing and complementing poems of a certain genre - the creation of a diwan - creates an active appearance in literary processes. In the first attempts, it was customary to add poems and jokes to the diwan. In our view, this reflects more social motives, the predominance of the point of view of synchronization with the period. Indeed, the poet and the period are inseparable concepts. It is natural that the processes directly in the space of life and activity, the need to evaluate it in the context of the literary requirements and criteria of the time, led to the introduction of poems and comedies in the first-order diwans. In the following periods, the rules for creating a diwan gradually expanded. In particular, special attention is paid to the compilation of poems whose rhymes and rhymes end with certain letters. Interestingly, these updated diwan also featured poems in the qasida genre after praise and notes. Of course, there is a reason for this. First of all, the representatives of Eastern poetry developed under the protection and pressure of the authorities until the middle of the XIX century. In the life and work of the creators of this or that period can be seen the influence of the support of the authorities or, conversely, an unfair attitude. That is why Navoi's reform of the diwan tradition in the 15th century is recognized as a literary revolution.

Literary scholar D.Salohi writes about this: “If we think about the poet's comments in the preface of Badoe'ul-bidoya, the structure of the diwan, we see that Navoi was a pioneer not only in the poetry of his time, but also in the field of diwan [Salohi. 26].

These rules of Navoi'sdiwan composition are described in detail in the preface of his diwan "Badoe' ul-bidoya" in the following order:

1. First of all, each of us has arranged the diwan, which consists of 32 letters in the composition of the people, and in the book of the nation they do not refer to the shoe, the four letters. [Navoi. 20]. Thus, according to Navoi, the poets who arranged the diwan do not pay due attention to the four letters (پ (pe) چ (che) ژ (dje) گ (ge))that exist in the Turkish script.

2. They do not follow the stylistic difference between the ghazal of each letter and the previous ghazal. It is inevitable that in every commandment, the HaqqSubhanahu WA ta'ala praises the Messenger of Allaah (peace and blessings of Allaah be upon him) for a moment, or he is a generation that is not unaware of a command that indicates these two things [Navoi. 21].

So, according to this rule, at the beginning of the poems in each letter category in the diwan is the introduction of poems with the content of praise or nat. This event gives each group of gazelles a unique spirit of independence.

3. On the other hand, it is as if some people do not understand anything other than the description of the metaphorical beauty and the purpose of the appearance of the handwriting. I can't find Diwan and I can't be a ghazal, I can't be a byte preacher at the moment. When the world is

finished, all the toil and toil will be wasted. In this regard, I have written all the praises and sermons in this divan, and I have been inspired by a few verses of advice and sermons. If the verses of these ghazals are not a joke, but a veil, then the exhortations and sermons of these verses will be an obstacle" [Navoi. 21].

4. Some of the poets who wrote the ghazal said, "If the matla is a special kind of verse, they do not wear itmamkhilaat and anjamkiswatin in the style of hamulmatla. "This picture of the spot seemed distant and polite." [Navoi. 22].

5. That the poet tried to include in the diwan all his poems of all kinds (genres) that were shoe in his time. Badoe' ul-bidoya includes almost all types of poems that existed in the Persian and Turkish literature of the time - "diltortarghazals", "ruhafzomuhammas", "ravonosomusaddas", "mufitruboiyot", "barjastaqita", " dilpazirmusta'zods, "unique individuals," problems, dictionaries, tales, and hens. Diwan does not include only works written in the genre of masnavi and qasida. This is because the poet called them "any other place" [Navoi. 22] in the hope that it would be collected as separate books.

MAIN PART

Muhyi's Turkish diwan is now kept in the Manuscripts Department of Institute of Oriental Studies named after Abu RayhonBeruni of the Academy of Sciences of Uzbekistan under inventory number 1303. It consists of 161 pages. Copied in Nasta'liq letter in 1320/1902. Size: 13x20.5 cm. In addition to this information, the title of Diwan states that it was written in Uzbek. However, in the process of careful study of this manuscript, we came across almost no Uzbek ghazals (there are very few Turkish poems in it). After that, in order to find a manuscript of the poet's Turkic office, the department of manuscripts of the main library of SamSU named after Abdurahmon Jami, Samarkand State Museum named after A. Ikramov, Department of Manuscripts of Institute of Oriental Studies named after Abu RayhonBeruni of the Academy of Sciences of Uzbekistan, Tashkent State Museum of Literature, Fergana State Museum of Literature named after G. Gulom, Andijan We carefully examined all the manuscripts available in the museums of literature and in the private house museums of Professor I.Abdullaev, but we could not find a manuscript copy of this diwan. However, it should be noted that the perfect manuscript of Muhyi's Uzbek and Tajik diwans is selected in the Department of Oriental Manuscripts of the Academy of Sciences of Tajikistan. [Mirzoev. 190-191]. This manuscript of Diwan in Tajikistan was published in 1319 h. / 1901 m. copied by the poet Muhyi. The title indicates a Persian-Tajik diwan stored with inventory number 885:

سرگشته در تحیر چشمت غزالها

Эй аз фуруғи ҳусни ту акси ҷамолҳо,

Саргашта дар таҳаййур чашмат ғизолҳо - b

yte, and the Uzbek-language diwan stored under inventory number 887

ایکی عالم گولشنی اندین تاپیب نشؤ نما

Эйбаҳорисанъатингдиндаҳрўлубгулшансаро,

Эйкиоламгулшаниандинтопибнашъунамо.

It starts with this byte. The catalog states that the diwans are composed of ghazals, qitas, qasida, masnavi and poetic letters dedicated to the poet's contemporaries.

This copy is the same as the copy of the poet published in lithography in Tashkent in 1911 (after the poet's death), which is now stored in the fund of lithographs of Institute of Oriental Studies named after Abu RayhonBeruni of the Academy of Sciences of Uzbekistan with inventory number 3220. That's why we used mostly these copies to cover the topic.

The diwans include poems in the genres of ghazal (muwashshah ghazal), qita, fard, masnavi, rubai, murabba, musaddas and qasida. It should be noted that there are 7 genres of poetry in the Turkish diwan and 6 genres in the Persian diwan. However, the exact same genres are not included in both diwans. For example, in the Turkic diwan there are genres of ghazal, qita, fard, murabba, musaddas, masnavi and qasida, and in the Persian diwan there are ghazals, qita, rubai, fard, qasida, masnavi. By comparison, the Turkic diwan does not include poems of the rubai, the Persian diwan includes poems of the murabba and musaddas genres. The genres of ghazal, qita, fard, qasida, and masnavi are available in both divans. So, there are a total of 8 genres of poems in the poet's divans. Note the following table:

Genres	ghazal	Kit'a	fard	kasida	ruboiy	murabba'	musadddas	masnaviy
Turkish diwan	153, 1438 bytes	81, 165 bytes	6, 6 bytes	1, 21 bytes	-	1, 7 verses (28 bytes)	1, 7 verses (42 bytes)	2, 29 bytes
Persian diwan	277, 2668 bytes	103, 221 bytes	24, 24 bytes	2, 78 bytes	2, 4 bytes	-	-	4, 273 bytes
Total	430	184, 386 bytes	30, 30 bytes	3, 99 bytes	2, 4 bytes	1, 7 verses (28 bytes)	1, 7 verses (42 bytes)	6, 302 bytes
The total volume of the Diwans	4997 bytes (9994 lines)							

The leading genre in both diwans is ghazal, which makes up a large proportion of diwans in number and size. The Diwans are mainly ghazals ending in 28 letters of the Arabic alphabet and 2 letters of the Turkish alphabet, which are arranged in the following order:

Alphabet	**The number of ghazals in the Turkish diwan**	**Bytes**	**The number of gazelles in the Persian diwan**	**Bytes**
أ	15	144	34	321
ب	5	43	13	120
ت	7	66	26	243
ث	3	27	4	36
ج	3	35	3	28
چ	-	-	1	9
ح	3	27	3	27

خ	2	18	3	29
د	4	36	48	483
ذ	2	18	2	18
ر	21	205	7	74
ز	5	56	5	49
س	3	26	3	27
ش	2	18	9	86
ص	3	25	3	26
ض	2	18	2	16
ط	2	17	4	36
ظ	2	18	2	17
ع	2	17	4	36
غ	3	27	3	26
ف	2	16	3	27
ق	2	18	3	30
ك	5	10	6	60
گ	4	36	-	-
ل	10	87	8	96
م	10	96	16	155
ن	15	149	25	253
و	3	25	4	39
ه	12	103	13	119
ى	6	57	18	182
Total:	**153 gazelles**	**1438 bytes (2876 lines)**	**277 gazelles**	**2668 bytes (5336 bytes)**

The total number of gazelles in the Turkish diwan is 153, and their volume is 1438 bytes (2876 lines); the number of gazelles in the Persian diwan is 277, and the volume is 2668 bytes (5336 lines). So, the poet's Persian diwan is quite weighty. As for the Turkish diwan, the number of ghazals in the Persian diwan is 124 ghazals, 1230 bytes (2460 lines) more. The total number of ghazals in Persian and Turkish diwans was 430, and their volume was 4106 bytes (8212 lines).

Diwans mainly have ghazals from 5 bytes to 19 bytes, of which the most widely used in terms of number and weight are ghazals of 8 and 9 bytes. The remaining 5, 7, 10, 11, 12, 13, 14 byte gazelles did not make up a large proportion of the diwans in number. As for the 18- and 19-byte ghazals, first of all, they are included in the Turkish diwan only once. One of them was written in response to a letter sent by Mullo Abdullahjon Nasimi, as noted by the poet himself, and the other was written in response to a letter sent by Nasimi Khokandi, as it is written in the preface of the ghazal. This, in turn, led to an expansion of the volume of the ghazals.

Muhyi wrote his ghazals mainly on orifona, romantic and social topics. It should be noted that there are no rindona gazelles in the diwans. Romantic ghazals are much more numerous. Many of them are reflected in the poet's muvashshahs.

In the Persian diwan, after the ghazals, there are 103 (221 bytes) kita (fragment)s, including 2 (4 bytes) rubai, after the kita (fragment)s, 24 fards and 4 (273 bytes) masnavi.

There is only one murabba and musaddas in the Turkish diwan, but there are no poems of this genre in the Persian diwan. The Diwans have a great deal of poetry from the kita (fragment)al

genre, covering a wide range of philosophical and social themes. They are placed in the Turkish diwan after the ghazals under the heading "Elephant kita (fragment) ayzon" on page 342 of the diwan, and in the Persian diwan under the heading "Elephant kita (fragment) var-ruboiyoot" from page 184. In the Persian diwan, as indicated in the title, rubai were also included among the kita (fragment)s, and to distinguish them from the kita (fragment)s, they were preceded by the title "rubai."

The first kita (fragment) of the Turkish diwan is as follows:

Муҳйики қаноат этти пеша,

Манзури туъиззу ман ташодур.

Ҳорискиталабишиҳамиша,

Мақҳуритузиллуманташодур. [Девон. 342].

Muhyi creatively mastered the experiences of the unique poet, creating kita (fragment)s full of high ideological content and sophistication. They reflected the images of a wise, prudent and perfect man. The kita (fragment), in general, is not strictly limited in its size, weight, theme, ideological content, as the poetic fragment is considered as a diary of the poet's ideas about life, life, man, compact poems. We have chosen to divide the kita (fragment)s of the Muhyi diwans into groups according to their subject and content:

1. Kita (fragment)s devoted to the expression of moral, enlightenment, philosophical ideas of a social nature.

2. Kita (fragment)s dedicated to the depiction of specific events and real personalities.

3. Kita (fragment)s on a romantic theme.

Many of the poet's social, moral, and philosophical themes promote such virtues as not being greedy for wealth, enduring hardships, giving up arrogance, and being a companion to the good.

In one of the didactic kita (fragment)s of the poet, it is said that collecting dice increases arrogance, and the abundance of wealth makes the owner more proud and, as a result, can hurt others.

On the following kita (fragment), the poet urges the reader to put his trust in the Creator in everything, to persevere in the face of adversity, to abandon worldly desires, career ornaments, and to embrace poverty and despair.

Ҳақ зотиға ҳамиша таваккул айла,

Ҳар меҳнату ғам келса таҳаммул айла.

Мискинлиғу навмидлиғ айлаб пеша,

Тарки ҳавасу жоҳу тажаммул айла.

Муҳйи сўзини жумла ҳақиқат англаб,

Ҳарнуктасигаонитааммулайла. [Девон. 344].

The total number of kita (fragment)s written in the Turkish diwan with any relation or to individual persons is 10 in total. Some of them (for the sake of the shopkeepers, for the Eid, in

the year of the prohibition of pilgrims, the kita (fragment)s written to inform the back of the image of Islambul) are a series of kita (fragment)s.

It should be noted that the diwan consists mainly of two- and three-byte kita (fragment)s. Of these, two-byte kita (fragment)s are the most commonly used in terms of number and weight. In our previous poems, it was said that Muhyi creatively followed Fuzuli and created many poems under the influence of his poetry. His passion for Fuzuli's poetry prompted Muhyi to write poems dedicated to his description. As a result, the poet wrote two kita (fragment)s in the Turkic diwan in Fuzuli's description. Both kita (fragment)s, which Muhyi wrote to Fuzuli, consist of two bytes. According to the poet, Fuzuli's diwan consists of enlightenment, science and tradition from the beginning to the end, as if it were a huge garden. Fuzuli himself is arif. And his kind words amaze the sages of the world. Let him make the place of the Creator Fuzuli from heaven. Because he was a guardian and a mystic.

The kita (fragment)s written at the request of the shopkeepers in Diwan, as we have noted, are a series of kita (fragment)s. All 6 kita (fragment)s of these 12 bytes are focused on the shortcomings that exist in society, in particular, some shortcomings in matters of trade. The poet speaks mainly of cash and credit trade on these kita (fragment)s. Encourages people to trade in cash as much as possible. Even if the loan is traded, it is necessary to return the deposit to the owner whenever possible, not to harm the owner of the property under various pretexts and frauds.

The number of kita (fragment)s dedicated to the Hajj is 18. They are also all 2-byte kita (fragment)s. They mainly describe Hajj and its virtues. Since sacrifice is one of the pillars of Hajj, in some places there are thoughts about the Eid al-Adha.

Ийди қурбон ҳар кишиким хайр этиб қурбон қилур,

Ҳақ таъола ҳам ўшал мўъминға кўп эҳсон қилур.

Тавба айлаб йиғласанглар, эй мусулмонлар, мудом,

Очилиб каъба йўли ҳаж айламоқ осон бўлур. [Девон. 350].

According to the poet, the reason for the closure of the pilgrimage, the cessation of the pilgrimage, is the large number of sins on the shoulders of Muslims. If they repent of their sins and purify their hearts, Allah will make the path of the Ka'bah easier for them.

Another of the series is dedicated to the depiction of about twenty photos sent from Istanbul, Turkey. Muhyi writes about this at the beginning of the kita (fragment):

The kita (fragment)s depict various structures in Istanbul, such as mosques, madrasas and mausoleums, rivers and bridges, royal armies and their barracks. On one kita (fragment), the poet describes the city of Istanbul as the head of all countries:

ШаҳриИсломбулкибуоламаро,

Барчакишварнижаҳондабошидур.

Айлағилназзорабутасвираро,

Жумласиулкупурукнибошидур. [Девон. 353]

On the next kita (fragment), written as a commentary on the image of the artillery, the poet praises the military power of the country. He compares each player in the picture as if he were a dragon and writes:

ҲазратиСултонҲамиднишукри,

Чиққонэрконулказармадинбири.

Ушбулардуртўпчиларнисурати,

Ҳарбиридурбегумонбираждари. [Девон. 354]

The poet's Persian divan, like the Turkish divan, has a series of kita (fragment)s dedicated to the description of the paintings depicting the city of Istanbul. To prove our point, we comment on the kita (fragment) of the poet dedicated to the image of the castle of Holota:

Иниморатрокибинидарҷаҳон,

Азшукуҳашдарзамонағулғуласт.

ГарнадониМуҳйимегўядшунав,

ҚалъаиХолотадарИстамбуласт. [Девон. 154]

Meaning: See this building that exists in the world. The people of the time are amazed at his greatness. If you don’t know anything about this building, listen to Muhy. This is the Holy Father's Fortress in Istanbul.

After the kita (fragment)s dedicated to the image of the city of Istanbul in the Persian diwan, the kita (fragment)s dedicated to some of the poet's contemporaries are placed. These kita (fragment)s of Muhyi are dedicated to Andijan judge MulloSayyidJaloliddin, Tajalli, MiyonYunushantora, Shokirjon and MulloNumanjonSamarkandi.

The poet has 103 (221 bytes) in the Persian diwan and 87 (165 bytes) in the Turkish diwan, for a total of 190 (386 bytes) kita (fragment)s. The poet wrote his kita (fragment)s mainly devoted to the expression of moral and enlightenment ideas of a social nature, the depiction of specific events and real personalities, as well as romantic themes. The poet's philosophical tone and generality prevail in the first kita (fragment)s, in the second the direct attitude to society and people, sometimes to certain events, and in the third the expression of delicate lines depicting the image of a friend. Muhyi created these kita (fragment)s with high ideological content and full subtlety. On the kita (fragment)s he portrayed the images of the wise, the learned, and the perfect man.

There are 6 individuals in the Turkish diwan after the kita (fragment)s and 24 individuals in the Persian diwan. They were originally called Mufradot to distinguish them from the kita (fragment)s.

It is well known that individual specimens of poetry in the form of ‘individuals’ were relatively independent, emerged as a special fruit of the author’s observations, and in many cases had separate living specimens. It is one of the smallest, most concise lyrical genres in terms of volume in poetry, and is considered an independent poetic work with an aphoristic complete content.

Individuals of Uzbek literature, such as Khorezmi, Sayfi Sarai, Yusuf Amir, Navoi, Babur, Khoja, Uvaysi, Raqim, Almai and Muqimiylar, rhymed in the form aa.

The study found that Muhyi rhymed 25 of the 30 individual bytes as aa. It is evident from this that Muhyi also, according to tradition, sought to create mainly musarra - a pair of rhyming fardbytes.

AlisherNavoi's last, fifth rule on the design of the diwan stated that the diwan should not include only works written in the genre of masnavi and qasida, as each of them had a separate mujallad. At first glance, this rule does not seem to be followed in Muhyi's office. The reason for this is that the poet's Turkish diwan included one verse and one masnavi, and the Persian diwan included 2 verses and 4 masnavi. However, this does not mean that Muhyi is not finished in another verse or masnavi. Because in the process of reviewing the many sources related to Muhyi's work, we came across so many poems and masnavis that were not included in the poet's Turkish diwan that it is even possible to compile them into a separate book.

CONCLUSION

So, in the Turkish diwan there are 153 (1438 bytes) ghazals, 81 (165 bytes) kita (fragment)s, 6 individuals (6 bytes), 1 (21 bytes) poems, 1 (7 points) murabba, 1 (7 points) musaddas, 2 (29 bytes) masnavi; 277 (2668 bytes) ghazals, 103 (221 bytes) kita (fragment)s, 2 (4 bytes) rubais, 24 (24 bytes) fards, 2 (78 bytes) poems, 4 (273 bytes) masnavi are placed in the Persian diwan . The Persian diwan is 16 (56 bytes) more than the Turkish diwan, 18 (18 bytes) more than the fard, 1 (57 bytes) more than the qasida, and 2 (244 bytes) more than the masnavi. Based on the results of the research, it can be said that a total of 8 genres were used in Muhyidiwans - ghazal, qita, rubai, murabba, musaddas, fard, qasida, masnavi. Their total size is 4997 bytes (9994 lines).

Based on the topic, the article mainly researched the Turkish and Persian diwans of Muhyi and found that the total volume of these diwans was about 10,000 verses. However, it should be noted that many poems related to the poet's work are not included in these divans. Although the only example is that the poet has many muhammas in his work, there is no muhammas in either of his diwans.

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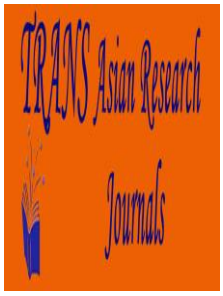

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MODERN TRENDS IN TEACHING FOREIGN LANGUAGES AND INTERCULTURAL COMMUNICATION (ON THE EXAMPLE OF GERMAN)

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ABSTRACT

The methods of teaching German today may not be exactly the same as 10-15 years ago. First of all, because in the era of the Internet and desktop systems, a lot of opportunities for teaching German appear before the teacher. Among them are interactive courses, online communication, watching films in German and many others, the use of which in the classroom depends on the teacher's personal creative approach? This article provides a theoretical approach to the methods and effective ways of teaching a foreign language.

KEYWORDS: *The Cognitive Sphere of the Subject, the Motivational Sphere of The Individual, Linguistic Consciousness, The Modern Approach To Teaching, The Pedagogical Experience Shows.*

INTRODUCTION

Although in recent decades the range of psychological and pedagogical problems associated with teaching a foreign language has expanded significantly (new works are noted in the thesis), however, the problem of the relationship between the personality characteristics of an individual learning a language and his subjective characteristics has not been sufficiently studied. The effectiveness of mastering foreign languages depends on the characteristics of the cognitive sphere of the subject of mastering, the motivational sphere of the individual, the development of skills for self-regulation of educational activity.

In the development of scientific and methodological foundations for the study of German literature at the language faculty of a pedagogical university, the category "linguistic consciousness" is decisive, which acts as a kind of semantic integrator of individual, personal and subjective resources of a person learning a foreign language. In the aspect of the category "linguistic consciousness", it seems possible to determine the parameters of teaching technologies, focused not only on the formation of linguistic knowledge, skills and abilities, but

also on the development of a person who uses a foreign language as a resource for self-actualization. s

Further, based on the works of P.Ya. Halperin reveals the difference between linguistic consciousness and cognitive consciousness. Cognitive consciousness is formed in the process of practical interaction of the subject with external objects, and in the same process its truth is verified. The content of cognitive consciousness is the images of objects, connections and relationships between them. The senses and logical thinking serve as the channel of cognition. The criterion for selecting the content of cognitive consciousness is practice as a purposeful activity of the subject to coordinate the results of activity with the aim of acting in a specific situation. Unlike cognitive, linguistic consciousness has developed not as a means of reflecting reality, but as a means of modeling the external and internal world of an individual.

Let's move on to consider some modern, innovative technologies for teaching a foreign language, aimed at more effective personal development and adaptation within the framework of a modern rapidly changing society.

Active learning is based on the fact that the student is increasingly faced in real life with the need to solve problem situations. This method is aimed at self-organization and self-development of the individual. The basic principle is that the learner himself is the creator of his knowledge. Active learning is, of course, a priority at the present stage of teaching a foreign language. It is necessary to give preference to active teaching methods, which are aimed at the formation of the student's independence, flexibility, critical thinking. The object of studying foreign language is foreign language speech activity as the most important means of intercultural interaction in general. Intercultural interaction is possible only if students have formed all the components of a foreign language communicative competence (ICC): educational, language, speech, socio-cultural and compensatory.

The modern approach to teaching is to build it on a technological basis. General principles and rules of teaching technology are seen in the following: goal setting; transformation of the student's activity into his independent activity; concretization of educational and developmental goals and methods; thematic planning, including a brief description of the final results and the construction of the entire chain of individual lessons, connected by one logic; control at each stage of the student's educational and cognitive activity; stimulating his creative activity, focusing on the student not only knowing, but also able; a variety of forms and methods of teaching, non-admission of universalization of a separate means or form.

However, the rate of its spread is incredibly rapid. The use of Internet technologies in foreign language classes is an effective factor for the development of student motivation. In most cases, the guys enjoy working with the computer. Since the classes are held in an informal setting, the learners are given leeway, and some of them can “shine” with their knowledge of ICT.

The prospects for the use of Internet technologies today are quite wide. This could be:

- Correspondence with residents of the countries of the studied languages via e-mail;
- Participation in international Internet conferences, seminars and other network projects of this kind;

- Creation and placement in the network of sites and presentations (They can be created jointly with the teacher and the student. In addition, it is possible to exchange presentations between teachers from different countries).

As the pedagogical experience shows, the work on the creation of Internet resources is interesting for students for its novelty, relevance, and creativity. The organization of students' cognitive activity in small groups makes it possible for each student to show their activity. The World Wide Web provides a unique opportunity for foreign language learners to use authentic texts, communicate with native speakers, creating a natural language environment and forming the ability for intercultural interaction.

Purposeful use of Internet materials in foreign language classes allows you to effectively solve a number of didactic tasks, namely:

- Improve reading skills;
- Replenish the vocabulary with the vocabulary of a modern foreign language;
- Improve the skills of monologue and dialogical expression, discussing materials on the network;
- To form a stable motivation for foreign language activities in the process of discussing problems of interest to everyone.

The Internet presents exceptional opportunities in the process of teaching a foreign language for mastering the means of communication in writing, providing the opportunity to implement a communicative approach to teaching written types of speech activity. For the purpose of teaching a foreign language, both free communication on the network and communication in the e-mail mode are used.

To achieve the maximum effect, it is necessary to use a wide range of innovative, including, of course, various media educational technologies in the educational process.

In the modern methodology, "multimedia" is considered as one of the many technical teaching aids (TCO), which is able to solve a range of problems, determined by the didactic properties and functions of this CO. From this point of view, multimedia is a TCO that integrates different types of information - sound, visual, and provides interactive interaction with the learner. The properties of interactivity, that is, the ability to control the process of presenting information, involves the student in an active educational process, stimulates his cognitive activity, and helps to maintain a stable motivation for learning.

This learning tool (multimedia) allows you to:

- ✓ integrate different types of information in one container object (text, sound, video) and present it by influencing different organs of human senses;
- ✓ develop skills for working with large amounts of information of various types;
- ✓ develop critical thinking;
- ✓ stimulate the cognitive process;
- ✓ interactively interact with trainees;
- ✓ adapt to the requests of the latter;

- ✓ organize group work in multimedia environments;
- ✓ to form a stable motivation for learning;
- ✓ Create conditions as close to reality as possible for the development of educational and professional skills.

Multimedia, as a learning tool, differs from other learning tools, first of all, by two main didactic properties: an integrative approach to presenting information in various forms (text, sound, video, etc.) and interactive interaction with a learner, which allows solving many modern didactic tasks, namely, to form key competencies, designated by regulatory documents as the basis for the content of modern education:

- Competence in the field of independent cognitive activity;
- Competence in the field of civil and public activities;
- Competence in the field of social and labor activities;
- Competence in the domestic sphere;
- Competence in the field of cultural and leisure activities.

Modern computer tools make it possible to create new computer programs, both teaching, training, and controlling. Such programs are created for special educational purposes and are widely used in the process of independent and homework when learning a foreign language. In case of independent study of the material, the use of a computer provides: 1) free work mode, 2) unlimited work time, 3) exclusion of subjective factors, 4) maximum support in mastering a foreign language. Computer means of control increase the efficiency of independent work, efficiency in obtaining the result, increase the objectivity of the assessment by 20-25%.

The introduction of modern methods and techniques into the educational process makes it possible to realize the goals of learning based on new approaches to education:

- ➢ Strengthen the practical orientation of education, focus on the development of personality traits, capable of effective life in a rapidly changing world;
- ➢ Ensure the continuity of general and vocational education;
- ➢ Having ensured functional knowledge of a foreign language, stimulate the student to continue language education;
- ➢ Develop the skill of students' independent work and their awareness of the need for continuous education and self-improvement;
- ➢ Strengthen the individualization and differentiation of the process of teaching foreign languages based on the student's personal experience;
- ➢ Contribute to the professional growth of teachers, the creation of a community of creative teachers.

The methodological foundations of teaching English have also changed significantly. New extremely effective methods, techniques and techniques of teaching English have appeared. In the course, we touch on the concepts of "cognitive linguistics", "corpus linguistics", "multiple intelligences", "teaching with dogma", "grammar", "and teaching with chunks" and many others.

Modern education is focused on the development of the cognitive potential of the individual, increasing the ability to learn, mastering new systems of knowledge, developing the creative abilities of the individual and expanding his creative capabilities. One of the innovative and little-studied ways of organizing training is a case-technology (Case Study). The essence of this method lies in the comprehension, critical analysis and solution of specific problems or cases (cases). The purpose of the case study method is to analyze the specific situation proposed by the teacher and additional information materials (using the potential of a group of students), develop an optimal solution and present it to the audience. The use of this method is most effective when teaching students of non-linguistic universities the language of business communication and the language of the specialty. Work on the posed problem situation takes place in groups of students, and it can be conditionally divided into the following stages:

- Analysis of the material presented, formulation of the problem;
- Discussion of various options for solving the problem;
- Choosing the best solution based on a comparison of all the proposed options;
- Presentation and defense of the solution.

Stage one - the analysis of the presented material can be carried out taking into account a specific issue or cover all aspects of the situation, which depends on the wording of the assignment. Stage two - discussion of various options for solving the problem takes place in groups (3 - 5 people). If the level of language training of students is high enough, then the discussion takes place in a foreign language. This is the best option for students to use vocabulary, grammatical and stylistic skills of constructing sentences in a foreign language as actively as possible. The teacher controls this process. Students in the course of work on a certain case are in the form of an interactive decision-making process. The presentation and defense of the decision can be presented both orally and in writing. At this stage, the analysis and discussion of joint activities takes place, the main task of which is the manifestation of the educational and learning results of working with the case.

The key point is that the problem situation should be relevant, taken from real life. Using the method of specific situations allows you to:

- Take into account the educational, personal interests and needs of students, their individual psychological characteristics;
- Monitor knowledge of a foreign language;
- Apply all forms of classroom work with students: individual, pair, group, frontal;
- Develop all types of speech activity: reading (overview, selective, detailed), speaking (monologue, dialogical speech), writing (planning, writing essays, etc.), listening and translation;
- Carry out interdisciplinary communications;
- Stimulate the creative activity of students.

Application of the case-study method makes high demands on the level of training of students. A difficult task for a teacher, requiring erudition, pedagogical skills and time, is the development of

a case, i.e. selection of the appropriate real material, which simulates a problem situation and reflects a set of knowledge, skills and abilities that students need to master. The peculiarity of the work of a teacher practicing the case method is that he not only realizes his abilities to the maximum, but also develops them. The main content of the teacher's activities includes the performance of several functions - teaching, upbringing, organizing and research. Thus, case technology contributes to the development of the ability to analyze situations, evaluate alternatives, choose the best option and draw up a plan for its implementation. The case-study method contributes to the development of self-analysis skills, as well as analytical, practical, creative, communicative, social skills of students.

The choice of technology by each specific teacher is based on the analysis of the pedagogical situation. The definition of the technology of teaching a foreign language will necessarily be affected, for example, by the amount of time allotted for a subject, a separate topic; the level of preparedness of students, their age characteristics; material equipment of the educational institution; the level of preparedness of the teacher himself.

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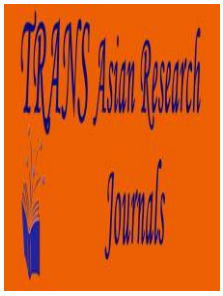

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THE CHANGES IN AMIR TEMUR'S MILITARY TACTICS AND STRATEGY (1379-1404 YEARS)

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ABSTRACT

This article will tell about the contribution of the great statesman Amir Temur to the development of military art, directly about the army and its structure, the structure of the army, its structural arrangement, innovations introduced into tactical methods, the location of the military tactically and other methods of warfare, in general, about changes in military tactics and strategy during the war.

KEYWORDS: *Tactics, Strategy, Kunbul, Khabargir, Javongir, Barongar, Chagdavul, Center (Qo'l)-(G'ul), Hirovul, Commander (Smir Ul-Umaro), Manglay, Tuprad, Sipohiy Favji, Ogruq, Yazak, Taloya, Oron, Rad, Radandozs, Takhshandozs.*

INTRODUCTION

The history of military Amir Timur, rightfully recognized him as one of the greatest military leaders in the world. Our great-grandfather's military talent was manifested mainly in two directions: skillful as a military organizer and an outstanding commander.Throughout his adult life, he pursued a policy based on such slogans as *"Haq bo'lsang, najot topasan"* (if you are right, you will be saved), *"kuch adolatdadir"* (strength is in justice), and his grandfather contributed to the development of world military art along with politics, economics, social justice, cultural development, public administration.

Amir Temur was the first to legitimize the social status of the military army and introduced the concept of social attention that the state paid to the soldier, and not only for bravery or combat actions, as a factor of victory in the main battle.

Amir Temur, in addition to emphasizing the blessing and attention shown to them, led ordinary soldiers into the fifth category: he noted that "Sipohiylarimni hamisha jangga tayyor holda tutdim, oylik haqlarini so'rattirmay vaqtida berdim. (I always pay soldiers` salary on time) Chunonchi, Rum yurishida sipohiylarimga o'tgan va kelajakda qiladigan xizmatlari etti yillik ozuqalarini birvarakayiga berdim (For example, before fight in Rum I have paid for seven years

salaries all of them)"[1] And he noted also: "Amirlar, sarhanglar-sipohsolorlarga majlisimdan o'rin berib, martabalarini yuqori ko'tardim (I careered advancement of army chiefs). Ular bilan suhbatlashib, maslahatlar oldim (I conversed with them, got advice)" and put the army chiefs in the fourth category.[2]

Historical sources indicate that Amir Timur was the commander of 313 beks (governor) in various parts and divisions of the restored powerful army. The first hundred of them were unbegilik (chief of hundred soldiers), the second hundred were a yuzbegilik (chief of second hundred soldiers), and the third hundred were holders of the rank of a mingbegilik (chief of third hundred soldiers). Amir Temur's supporters and commanders have expressed their trust in him since his first visit to the political arena of Temur, which consisted of skilled people, namely his friends, as well as the owners of infallible, who demonstrated their resilience, intelligence in various battles, and the grandchildren. Amir Temur wrote in his work, namely "Tuzuk": "Uch yuz o'n uch amirimning barisi aql-hush egalari, mahoratli sarkarda, g'anim lashkari to'pini buzib, uni mag'lub etuvchi kishilar edi (313 my emirs are smart, they are skillful commanders, they know how to defeat the enemy). Jangning sir-asrorini, g'anim askarlarini sindirish yo'lini bilgan, urush qiziganda o'zini yo'qotmasdan, qo'l-oyog'i bo'shashmasdan, lashkar favjlarini jangga boshlay oladigan, agar qo'shin safiga rahna tushsa, uni tezda tuzata oladigan kishigina amirlik va hukmronlikka loyiq hisoblanadi".

If we give information directly about the army and its structure, then the following units functioned in the army of the great army: kunbul/kumbul–hirovul, manglay, radandozlar, sonsiz, talol, takhshandozs, khabargirs, yazak, chagdovul, quvguner, shocking from behind, cavalry, advanced part, the advanced part that conducts the intelligence work with combat, artillery, personal guard, night guard group, a group of crossbow shooters (the humming and pitchers were filled with gunpowder, the mouth was rinsed, and the fuse burned and shot towards the enemy with the help of a clown), spy, scouts, day guard cavalry group, auxiliary unit in reserve, cavalry unit used to capture.

Sahibkiran decided to reorganizing the order structure of Genghis Khan's army. The structure of the army, its structural location, tried to introduce innovations in its tactical methods. From the point of view of tactics, Amir Temur's army was allocated to 7 divisions or 7 captives. The division of the army into *unlik, yuzlik, minglik*and*tuman*was used in the performance of tasks set during the battle. Amir Timur developed a method of conducting combat in 7 divisions (captives) of the army after the famous "Jangi loy" (Battle in clay) (1365). Sahibkiran for centuries, which improved the way of fighting the Turkish-Mongol troops into five parts, was revised after the same battle and supplemented with side guards, cavalry attacking at the right time. He used new method with battle the Mongol khan, Tukhtamishkhan in Kunduzcha, near the river of Volga, 1391. According to Sharafiddin Ali Yazdiy`s note, the army of Tukhtamishkhan was more than Amir Temur`s army.

Amir Temur promises to create an army in an unusual order from the state of the traditional order - the center, left and the right wing, and uses a new method of combat order, the army is divided into 7 captives. Emir Sulaymanshoh was commander in the center of army. After him, the army of Muhammad Sultan was located, after Muhammad Sultan, it was located the army of Sahibkiran reserve army, which numbered 20 army (buluk). The part of *Barongor*, it was located the army of Mironshah mirzo, the part of *kunbul* (wing), it was located the army of emir Khoji Sayfuddin barlos, the part of *javongar*, it was located the army of Umarshayk mirzo, for him, it was located the army of emir Berdibek as *konbul*, also was located the army of *Saribugo* hands.

Amir Temur took command of reserve army and the part of ugruk section. His status was behind the center, and anyone who needs help is ready to send support to him. Later it became known that the fate of the battle was decided by this military unit.[3]

Tokhtamishkhan divided his army into 5 divisions and appointed princes and high-ranking emirs of the Joji dynasty as their commanders. When it comes to the distance at which both sides can see each other, Amir Timur commands a division commanded by his grandson Mirzo Abubakir to set fire, tents, carpets in front of the enemy. Such demonstratively cold-blooded frosts negatively affected the psyche of the enemy.[4] The battle lasted three days and ended with a complete victory of Amir Timur.

Despite the fact that the total strength of the Sahibkiran army consisted of 800,000 cavalry and infantry, the number of troops participating in major marches ranged from 100,000 to 250,000 people. At the end of 1404 , the trip to China consisted of 272612 people.[5] According to historian Sharafiddin Ali Yazdiy`s note, according to the order of the trip, each *tumanbegi*, *mingbegi*, *yuzbegi*, *unbegi* acted in combat order with units and subunits of the combat manner instead of occupying their own level, position and ranks.[6] The person who violated the order was severely punished by the Sahibkiran. When the army stops to rest or goes to the battlefield, the perimeter of the army is tightly surrounded by chariots that are chained to each other, blocked by ditches, a chapar fence is laid on the belt, surrounded by mounds. The fortress was guarded by day-spring and night-field guards. With the appearance of the enemy, the army came out of the ditch and turned against him, forming a battle line. Each unit, group, section has its own password (Oron) to prevent hiding and vandalism during walks or sealing.

In most cases, Amir Temur pretended to be weak in order to engage the enemy army in battle. "Amr qildimki, dushman urush ochmaguncha o'zlaricha jangga kirmasinlar" (I ordered them not to engage on their own until the enemy opens war) noted Sahibkiran in his work, namely "Tuzuk".[7]This strategic trick (savkul-jaysh) would have a good effect in many cases.

The first clash with the opposition army was started by the light cavalry, that is, the guard, which was engaged in reconnaissance tasks. After that , the advanced units of the right and left wings - the main forward unit in support of barongor hirovuli (part) and javongor hirovuli (part)- entered the battle of manglay. Manglay was followed by the barangar and the other two parts of the javongor, the chapovul and the shikavul. If this force is not enough to defeat the enemy, then the leading forces, led by the commander-in-chief, amirul-ul-umaro, were thrown into a decisive battle. "Shundan so'ng Allohning madadu inoyatiga tayanib, lashkarboshining o'zi ham janggi kirsin (After that, relying on the help of Allah, let the commander himself join the battle). Meni ham urush maydonida hozir deb bilsinlar (Let me also be recognized by those present on the battlefield). Allohning yordami bilan g'animga sakkiz zarba etgandan so'ng, to'qqizinchi zarbada dushman engilib, fathu nusrat nasib bo'ladi (After eight blows to the enemy with the help of Allah, the enemy will be defeated in the ninth blow and victory will be granted)".[8]

When the signs of the enemy's flight and defeat became apparent, a pursuer consisting of left-handed cavalry was assigned to pursue him. Stone lilies (catapults) were found near the walls of the enemy fortress, saws mounted on drums were restored, stones were thrown from each garaf facing the siege, raids were put into effect. Tunnels are dug under the pipes. Through the rafters that opened in the walls, the soldiers began to pour in like a flood. The soldiers climbed up using ropes, ladders, various rings. In the army of Amir Temur there are glasses with a combustible substance - naphthene (oil), a propellant herbicide - there are special gunners - radandozs, which

ensure the continuous production of rada. The number of such guns has reached 10 thousand, according to the writings of Nizamiddin Shamiy.[9]

The army was also organized precisely and carefully, its order of battle improved from battle to battle, the army was armed with the most modern weapons, the units differed from each other in clothing - head, flag and trim. Such a distinction was at hand when managing an army during a battle.Such news as the division of the army into parts, divisions, the introduction of certain types of military clothing for each of them, were later assimilated by European peoples.Amir Temur also provided pedestrians with horses as a basis for long walks, unlike the Mongols. It should be noted that at those times when it was necessary to shoot at a clear target, the cavalry also fell from their horses and moved without a bow, the cavalry with the main role in the army mobilized high-speed light cavalry and divided into heavily armed cavalry. The task of the heavily armed cavalry was to deliver a decisive blow to the enemy. If the Mongols used heavy weapons for security purposes, then Sahibkiran further strengthened their role in the battle.

In the army, along with cavalrymen, who formed the basis of the armed forces, pedestrians also served. Sahibkiran was one of the first in the East and brought firearms (*taprad*) to the army. Special military units and units were formed in the mountainous areas, which conducted military operations.

Such operations as the destruction of enemy mudofa by various methods, the battering ram strike on large enemy cities, the long siege of the fortress, the siege of the forces of the enemy on the largest possible scale, the conquest of the village, city, district, provinces one by one, the pursuit of the enemy to complete destruction. Tactically, Amir Temur's army had its own peculiarities. Intelligence is well established, the necessary measures and measures have been developed so that units can move at the required level on the battlefield or in combat ranks, with special emphasis on their rapid management during combat.

Another great merit of Sahibkiran in the development of the art of war was the introduction of a cavalry unit - a convoy, which was formed in order to protect the wings of the army from enemy attacks during the battle and, in turn, to bypass enemy's forces from the side and strike him from behind.[10]There was no such new military unit in the army of such noble generals as Alexander, Hannibal, Genghis Khan, Lyudvik XIV, Great Fridrikh. There was such a kism in Shayboniykhon's army, and it was named after *tulgama* (the name of tactic). According to military experts, Napoleon Bonaparte, before a military trip to the eastern countries, studied the structure of Amir Temur's army, his combat path, mastered tactical techniques that he considered necessary.[11]

The army operated in the following order of battle during the journey: far ahead of the main forces were the guard (avanpost), then manglay (hirovul) (avangard), barongor, javongor (center hand), chagdavul (avangard). The army was followed by ugrok (oboz).[12]

According to historical sources, the army of Amir Timur numbering 12 thousand people entered the battle in this order: The first confrontation with the enemy was started by a guard who was engaged in espionage. After that, the advanced units of the right and left wings — the main advanced unit in support of *baroness hirovuli* (part) and the *javongor hirovuli* (part)- engaged in battle with the *manglay*. After *manglay,* the part of two parts of *chopovul* and *shikovul* followed from *barongor* as well as *javongor*. If these forces are not enough to defeat the enemy, the leading forces led by the commander-in-chief (A*mir ul-umaro*) - the center (arm) - (hand) - were thrown into a decisive attack.

The tactical overview of the huge battles in which the so-called Sahibkiran army took part was as follows: the center of the army was divided into 40 divisions-regiments and was subordinate to the supreme commander. Of these divisions-regiments, 12 pieces consisting of rows are in the 1st row of the line, the remaining 28 pieces are in the 2nd and 3rd rows. In front of the right side of the forty sections, parts of princes were lined up, in front of the left side - parts of relatives and allies. In the *barongor* of the 2nd row, 6 pieces were ranked with their advance-*hirovul*. The same amount of piece, and there was also a part for *hirovul*.

In front of the 2nd *barongor* and *javongor* is a number of details in the above order. In front of him the head was moving forward - *manglay* (or *hirovuli buzurg*). Consisting of light cavalry, the army of the 2nd division was engaged in protecting the ram from attack, observing the movement of enemy forces.

And from a military-tactical point of view, the location of the army is also defined in the*"Temur tuzuks"*. The course of the battle, its duration, and the number of soldiers who should participate were personally calculated by Amir Temur himself.

According to the tactics of Amir Temur, when choosing a place where the battle will take place, the following should be taken into account: a place where it is convenient to place and store water, an army, you can dominate the enemy in the place chosen for the battle, and especially not to get into the face and eyes, as well as on the battlefield.[13]

Before the battle, the place of each of the ranks was assigned so that Amir's troops could move freely. The army had to go straight without turning both their horses to the right and left, when they encountered the enemy, they were vigorously thrown at him. This event was aimed at ensuring that the troops standing in line did not fire in vain, but conducted a fierce attack.

He had experience, and the skill had to carefully inspect the battlefield before the battle with the commander, find out from which side the enemy is superior, quickly eliminate his shortcomings, observe whether the enemy is attacking in separate detachments or engaged in battle with the secret troops, knowing whether they have secret plans.

The Russian military historian of the XIX century M.I.Ivan was given his own assessment and an unbiased assessment in this regard: "Hali bironta ham xalq qo'shinini to'g'ri saflashni bilmay, tartibsiz va taktik harakatlarsiz, faqat o'zidagi jasorat darajasi bilan uzun-yuluq jang kilayotgan bir paytda Temurning to'g'ri saflangan, bir necha yo'nalishdan iborat muntazam tartib bilan jangga kiruvchi, kuchli zahiraga ega bo'lgan kuchli armiyasi bor edi" (At a time when there was still a long battle with a level of courage in itself, without knowledge of the proper purification of the people's army, without unorganized and tactical actions, there was a strong army of Timur, entering into battle with a regular order consisting of several directions, properly built, having a strong reserve). "Harbiy san'atda egallagan beqiyos mahorati va botirligi unga janglarda deyarli hamisha g'alabalar keltirdi" (The unsurpassed skill and courage that he mastered in the art of war almost always brought him victories in battles).[14]Sharafiddin Ali Yazdiy also noted separately in his work, namely "Zafarnoma" that "hali hech kim o'ylab topmagan uslubni Sohibqiron o'ylab topib, qo'llaganligini" (the fact that he invented and applied a style that no one has yet come up with).

When the number of the enemy army exceeded 40 thousand people, Amir Timur himself opposed him. At this time , the army is preparing for battle as follows: 40 units were directly at the disposal of Amir Temur. The most sorted 12 units were occupied by the 1st row, the

remaining 28 were occupied by the 2nd and 3rd rows. 40 units indicating troops led by his son and grandchildren are located in front on the right side, while troops led by relatives and allies are located in front on his left side. Then there were wings, ranks and other units.

The Turkish fighters, who studied military tactics from Amir Timur, could not resist the enemy's attack, ran away on horseback and fired, unable to aim from a distance of 60-100 paces. To remove the tracks, they walked from four sides, after 5 calls each unit was divided into 3 parts, after 3 miles of walking they were again divided into 3 parts, and then on the agreed terrain they were collected in a jar at a distance of 40-50 miles from the starting point. Dispersal escape was accomplished by horseback riding in just over an hour and a half.

Sahibkiran Amir Timur believed that the more you know about the enemy, the easier it will be to win, and also paid special attention to the army unit engaged in espionage (informant, spies).It is noted that Amir Temur collected the necessary information about the border countries with the help of light units numbering 1,000 people. These divisions rode thuja through barren desert lands without water, while elsewhere the movement without cavalry and on foot. There was also a special sponsorship for travelers, traders and caravaneers, from which they could learn important information about the state of their country of origin.

This is how Sahibkiran Amir Temur managed to form the strongest and most efficient army of his time. The execution of strategic plans, such as the skillful destruction of enemy, striking large cities of enemy with a battering ram, a prolonged siege of fortified fortresses, as well as an extensive siege of the forces of the enemy, as far as possible, pursuing the enemy, lead the owner only to victory. As part of the army, special military units and units were created that conducted effective and rapid combat operations in mountainous areas.

Amir Temur also used various military tricks in battles. One of them is that he tied wood to horses in order to cause panic in the heart of the enemy, again and again driving his small army along the chetra from the battlefield. There was a panic noise, and from the dark dust-dust, the mind of the enemy soldiers hurried.

The ambassador of the Spanish King Rui Gonsalesde Klavikho wrote in his "Kundalik" (diary): "Harbiy ishlarda katta tajribaga ega Temurbek oz fursatda qo'shin to'plab, Erondan shoshilinch Turkiyaga yo'l oladi va Arzinjon erlaridan o'tib, Sabastriya shahriga etib keladi (Temurbek, who has big experience in military affairs, collected the army in a short time goes to Turkey from Iran and through the area of Arzinjon, arrives the Sabastriya city). Temurbekning bu erga etib kelganini eshitgan Boyazid o'z yo'lini o'zgartirib, yuk ortilgan barcha ot-aravalarini mustahkam Anguri qasrida qoldirib, qo'shinini Temurbekka qarshi qo'yadi (Hearing that Temurbek had arrived here, Bayazid changed his path, leaving all his horse-drawn wagons with cargo in the fortified Angur castle, and moved his army against Temurbek). Uning bu ishidan xabar topgan Temurbek ham o'z yo'lini o'zgartirib, baland tog'lar tomon yuradi (Temurbek, who was informed about this work, also goes his own way to the high mountains). Temurbek o'z yo'lini o'zgartirganini ko'rgan Boyazid esa, qochib ketyapti deb o'ylab, uni quvishga tushadi (And Bayazid, who sees that Temurbek has changed his path, thinks that he is going to run, rushes in pursuit). Temurbek tog'lar oralab sakkiz kun yo'l yurib, tekis yo'lga tushadi va Boyazidning ot-aravalari qolgan Anguri qasriga kelib, bu erdagi barcha narsalarni qo'lga kiritadi (Temurbek, after walking through the mountains for eight days, descends along a flat road, and Bayazid's horse-drawn carts arrive at the abandoned Anguri castle and seize everything that is there). Buni eshitgan Boyazid shoshilinch Anguriga qaytishga harakat qiladi (Hearing this, Bayazid hurriedly

tries to return to Anguri). Afsus, qasrga etib kelgan turk qo'shini holdan toygandi (Unfortunately, the Turkish army that arrived at the castle was exhausted). Boyazidni chalg'itish maqsadida atayin aylanma yo'llar bilan yurgan Temurbek shu erdagi jangda Boyazidni engib, uni asirga oldi (Temurbek, who deliberately made a detour in order to distract Bayazid, defeated Bayazid in a battle at this place and captured him)." [15]

Amir Temur paid great attention to the formation of a command staff of talented people with the necessary level of skill and qualifications in military affairs. Lyusen Keren, scientist from France, wrote in his book, namely "Amir Temur saltanati" (The reign of Amir Temur): "Uning qo'shinida har bir jangchi irqi, e'tiqodi va jamiyatda tutgan o'rnidan qat'iy nazar, ko'rsatgan mardligi va qahramonligi bilan qadrlanadi" (In his army, every soldier is valued for the bravery and heroism that he shows, regardless of race, religion and place in society).[16] A certain person with military abilities, regardless of his social status, has earned the title of a soldier. From the information and comments given in Sahibkiran's work "Temur tuzuks", it is not difficult to understand what a wise man he was, a man of skill. For example, in work such ideas are wise sayings that not only the warrior but every leader, man must follow: *"...ishbilarmon lashkarboshi o'zini va to'qqiz sipohiy favjini bir tandek ko'rib, ularni qo'l-oyog'i, boshi, ko'kragi va boshqa a'zolarini ishlatib kurashuvchi bir pahlavondek hisoblasin (Consider the business leader himself and the nine gypsies as a tandem and consider them as a wrestler who fights using his limbs, head, chest and other organs). Shundagina g'anim sipohi favjlari ustiga ketma-ket urilgan to'qqizta qilich zarbasidan keyin, to'qqizinchi zarbada, albatta, engilishiga umid qilsa bo'ladi (Only then could enemy hopes that after nine consecutive sword strikes on the fauns, the sepoys would definitely be defeated by nine blows)" or "... shunday qilib, Sardor aqlu tadbirkorlik bilan ish yuritib, shoshma-shosharlik qilmasin, chunki shoshqaloqlik shaytonning ishidir. Chorasi bo'lmagan ishga kirishmasin, chunki undan qutulib bo'lmaydi (Don't take a job that doesn't have the means, because it can't get rid of it)".*

In general, Amir Timur demonstrated his military tactics and strategy as a master commander during 40 years of his wars in Asia. His Holiness Amir Temur, the first regular army in world history that salted. Now the term "avangard" is used in the military. It is known that a special part of the Sahibkiran army, which was in the former ranks, was called so - "ovongort". The first military parade in world history was also held by our grandfather Jahangir. He established a strong iron discipline in his army.

Undoubtedly, our army today is a symbol of the evil of the army troops, the bravery of the defenders created by our great-grandfather, even for the defenders of our homeland. In a word, even if we study the lifestyle of our grandparents, the politics of statehood and or martial arts, we will certainly have our own affairs, thoughts, events and information that will be useful in our lives. After all, this is an example of what a person has done, everyone who said is equal to a fool a pearl.

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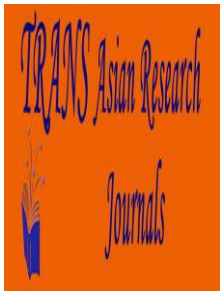

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A REVIEW ON 3D PRINTING FOR CUSTOMIZED FOOD FABRICATION

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ABSTRACT

The first-generation food printer concept designs and working prototypes are presented in this research, with the goal of revolutionizing personalized food production via 3D printing (3DP). Unlike robotics-based food manufacturing technologies that aim to automate manual procedures for mass production, 3D food printing combines 3D printing with digital gastronomy to create food items that can be customized in form, color, taste, texture, and even nutrition. This expands customization possibilities to the industrial cooking industry while also introducing creative skills to fine dining. On the basis of fabrication platforms and screen printing, the chosen prototypes are evaluated. For single or multi applications, a comprehensive description of various 3DP technologies and their associated dispensing/printing method for 3D personalized food manufacturing is presented. Food printing's effects on customized nutrition, on-demand food manufacturing, food processing technology, and process design are eventually discussed. Their use in home cooking and catering may offer not only an engineering solution for personalized meal design and nutrition management, but also a potential machine to reconfigure a customized food supply chain.

KEYWORDS: *Customized Food Fabrication, 3d Food Printing, Platform Design, Multi-Material.*

1. INTRODUCTION

Customized food items are in high demand, and the majority of them are presently developed and manufactured by highly educated craftsmen. The price is quite expensive for such a little number of components. Food Layered Manufacture, often known as three-dimensional (3D) food printing, may be one of the possible solutions to close this gap. Its goal is to layer-by-layer create 3D custom-designed food items without the need for object-specific equipment, molding, or

human involvement. As a result, this technology may improve production efficiency and lower manufacturing costs for the creation of personalized food items.

1.1.Food Printing and Robotics-based Food Manufacturing

Cooking is one of our most essential activities, and a robotic chef capable of following recipes would have a wide range of uses in both domestic and industrial settings. Baking cookies robots, for example, can find ingredients, combine them in the proper sequence, and put the resultant dough in an oven baking pan. These libraries-equipped robots can do daily manipulation tasks and fundamental motions like picking up, putting down, and pouring. These robotics-based methods are often employed in conventional food manufacturing for large production to automate manual operations[1]. They can significantly decrease workload, labor costs, and food production efficiency. Food producers are ecstatic about such advancements, but they are unclear about the reasons for and motivations for creating food printing methods and their distinct characteristics. As a result, a comparison between the two is necessary. two techniques is necessary[2].

Food printing differs from other robotics-based technologies in that it combines 3D printing (3DP) with digital gastronomy methods to create food items that can be mass customized in form, color, taste, texture, and even nutritional value. 3DP is a digitally controlled, robotic building technique that creates complicated solid structures layer by layer and fuses them together via phase transitions or chemical processes. The goal of digital gastronomy is to incorporate cooking process information into food production so that our dining experiences extend beyond taste to include all elements of gastronomy. Combining 3DP with digital gastronomy methods allows for digital visualization of food modification, opening up new possibilities for innovative food production at a low cost[3]. As a consequence, a personalized culinary design in the form of a digital 3D model will be converted immediately into a layered final product. Overview

Over the last several years, a lot of publications and papers on food printing have been published. The majority of them concentrated on manufactured new foods. Some academics have recently begun looking at basic problems in food printing, such as turning components into delicious goods for both health and environmental reasons. However, such material is dispersed among a variety of publications with varying technical foci[4]. The purpose of this article is to collect, evaluate, classify, and summarize relevant information on technology and its effect on food processing. The remainder of the paper is laid out as follows: Food printer ideas and platform designs, as well as a variety of printing materials, are discussed in section 2. Section 3 delves into the engineering of 3DP technologies for food printing, covering dispensing and printing technologies, as well as multi-material and multi-print head printing mechanisms. Food printing's effect on customized food design, personalized nutrition, on-demand food manufacturing, food processing technology, and process design is discussed in Section 4. Finally, in Section 4, a conclusion is given.

1.2.Food Printer Concepts and Platform Designs

The first generations of food printer concept ideas and prototypes are becoming available to the general public. A few research projects, ranging from concept designs to in-depth study on material extrusion and deposition, have been completed in a short time[5]. Conceptual Ideas: Nanotech Instruments Inc. patented a rapid prototyping and fabrication method for 3D food

objects in 2001, such as a custom-designed birthday cake. However, no physical prototype was built. Nico Kläber came out a Molecular concept design in Electrolux Design[6].

Ingredients in digital gastronomy may be decided based on online nutritional content, personal and societal preferences[7]. Table 1 shows three hypothetical ideas from the Massachusetts Institute of Technology (MIT) that incorporate a digital gastronomy concept into food printer design. Each one focused on a distinct element of cuisine, such as blending, modeling, and transformation[8]. These ideas seem to be more realistic than earlier concept designs, although they are still far from being technically viable.

Table 1: Summary of Conceptual Designs on Food Printer

	Concept Focus	Design Platform	Difficulties
Virtuoso Mixer	combine and mix diverse ingredients to control their quantities, types and source.	• top layer: storage containers to monitor temperature, humidity and weight • 2nd layer: processing chambers dedicated to mixing, whisking and crushing • bottom layer: extrusion unit with thermo control	• distribution and metering design between the layers, • machine cleaning • waste minimization.
Digital Fabricator	model and cook ingredients combination into specific shapes with defined dimensions	• refrigerated canisters of food • a three-axis mixing/printing head onto the printing surface • a fabricator chamber	• refilling canisters • machine cleaning • material supply to mixing head and storage system
Robotic Chef	transform existing ingredients into new flavour and design pattern	• two five-degree of freedom robotic arms • a tool head to localise transformations such as drilling, cutting and dispensing via syringes • a heating bed for cutting/cooking/ sintering	• design and program to fabricate diverse food shapes • complicated manipulation

1.3.Platform for Food Printing

The fundamental components of a food printer platform are a three-axis XYZ stage (Cartesian coordinate system), dispensing/sintering devices, and a user interface. Such platforms can manipulate food in real-time thanks to a computer-controlled three-axis motorized stage and material feeding system[9]. According to computerized design modeling and route planning, food composition may be deposited/sintered basically point by point and layer by layer. At least four functions are suggested to create and customize new meals rather than merely automate the conventional food manufacturing process: measuring, mixing, dispensing, and cooking (heating or cooling). In the present commercial or self-developed food printing systems, only the dispensing and cooking features are provided.

1.3.1. Food printers based on commercial platforms

Researchers adapted commercially available open-source 3D printing platforms for food printing to simplify the development process and save development time. One typical modification is to replace the original print head with a specifically built dispensing unit with an extra valve to regulate the material flow rate, or to replace the conventional inkjet binder with food-grade substance such as starch mixes[10]. Although not particularly intended for culinary applications, the Fab@Home system was one of the first desktop fabricators compatible with food ingredients. Frost ruder MK2 was also incorporated into the MakerBot Researchers utilized two solenoid valves to regulate the flow velocity of creamy peanut butter, jelly, and Nutella on the extrusion frost platform. A food printing platform with a printhead developed at the National University of

Singapore is shown in Figure 1. The platform is based on a Prusa i3 platform that has been modified to include a self-developed extrusion printhead[11].

(a) Food Printing Platform (b) Printhead

Figure 1: The Food Printing Platform Developed at National University of Singapore

Researchers can rapidly construct complicated food forms and analyze the properties and manufacturing methods of different food materials using a customized commercial platform. Those platforms, on the other hand, lack flexibility in terms of future development and are only relevant to a restricted range of materials, making them unsuitable for in-depth study.

- Food printers based on self-developed platform

Personality platforms are created to meet particular needs, such as producing 3D sugar structures using a browser laser machine, making 3D cheese and chocolate things from edible materials, or using open-source technology to reduce the cost of freeform sugar product manufacturing. They offer additional material dispensing options, allowing a suitable printhead to be developed and executed from a pool of candidates, as well as greater flexibility and optimization in dispensing parameters and manufacturing processes.Self-developed platforms are built based on specific requirements, such as creating 3D sugar structures with a computer-controlled laser machine, building cheese and chocolate 3D objects from edible ingredients, or reducing cost associated with freeform fabrication of sugar products with open-source hardware. They provide more choices for material dispensing so that a suitable printhead can be designed and implemented among a few candidates, dispensing parameters and fabrication process can be more flexible and optimized.

- User control interface design

User control refers to complete control over form, ingredients, and materials, all of which may have a big effect on culinary creation. The design of the user control interface has three functions: 1) offering tools for shape design and material selection for personalized food item design, 2) converting this design into a computerized 3D model, and 3) designing the dispensing route and related processing parameters. As a result, it's critical to provide an interactive user interface that connects to an open-access web-based template library.

Customers may use this interface to create their own customized food items, get design files from a technological service provider, and share their designs with other people. The goods may therefore be produced in front of consumers using a personal 3D food printer in a new context of home product manufacturing, which would be difficult to accomplish with current techniques.

CONCLUSION

3D food printing has already shown its worth by creating customized chocolates and basic homogeneous nibbles. These apps, on the other hand, remain basic, with restricted internal structures and repetitive textures. A systematic approach to investigating printing materials, platform design, printing methods, and their effects on food production is required. Meanwhile, the food design process should be organized to encourage user creativity, the fabrication process should be quantified to ensure consistent fabrication outcomes, and a simulation model to connect design and fabrication with nutritional management should be created. Meal's printers may become part of an ecological system, where networked machines may order new ingredients, make beloved food on demand, and even cooperate with physicians to design better diets, if an interactive open web-based user interface is developed.

DISCUSSION

This research presents the first-generation food printer concept sketches and functional prototypes, with the aim of revolutionizing bespoke food production via 3D printing (3DP). 3D food publishing, unlike robotics-based food manufacturing technologies that seek to automate manual procedures for mass production, combines 3D printing with digital gastronomy to produce food items that can be personalized in form, color, flavor, texture, and even nutrition. This gives the industrial cooking sector more customization options while also bringing gourmet dining to creative talents. The first prototypes and concept concepts for food printing are now accessible to the general public. In a short period of time, a few research projects spanning from concept designs to in-depth studies on injection molding and deposition were accomplished.They provide more material dispensing choices, allowing for the development and execution of a suitable printhead from a pool of candidates, as well as more flexibility and optimization in dispensing parameters and manufacturing processes. Self-developed platforms are created to meet particular needs, such as producing 3D sugar structures using a computer-controlled laser machine, making 3D cheese and chocolate things from edible materials, or using open-source technology to reduce the cost of freeform sugar product manufacturing.Only dispensing and heating functions are offered in current commercial or self-developed food printing systems.

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INTEGRATING SUPPLIERS—FINDING THE BEST CONFIGURATION

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ABSTRACT

There has been increased interest in supplier integration in recent years, much of it supporting such initiatives in organizations. We operationalize supplier integration as a bundle of practices that include a set of ''internal'' and ''external'' practices. We hypothesize that such practices in specific configurations can be as important a source of performance differentials as the adoption of individual practices themselves. We theorize the existence of a level of integration that results in optimal performance. The paper uses data from a cross-section of more than 300 US manufacturing companies to test the notion of an optimal level of supplier integration, and examine the conditions surrounding its development. The results provide empirical support for the concept of an optimal set of supplier integration practices. We show that deviations from the optimal profile are associated with performance deterioration, and that indiscriminate and continued investments in integration may not yield commensurate improvements in performance.

KEYWORDS: *Empirical Research, Management, Supply, Supplier Integration, Sourcing Strategy.*

1. INTRODUCTION

When it comes to supplier integration, there's a frequent question that comes up. How do some businesses get greater performance returns from supplier integration efforts than others? We believe that part of this effectiveness stems from the way integration practices are integrated and structured, rather than the character of the activities themselves. Supplier integration is defined as a condition of synergy achieved via a range of integration techniques among an organization's supplier, buying, and production components. From the standpoint of the purchasing company, we define success in traditional manufacturing c and firm level measures [1].

Favorable correlations between firm-level indicators of integration and organizational success. However, there is considerable uncertainty about how integration as a generic strategy affects

performance, whether some integration practices are more central to performance than others, the returns from integration, and whether complementarities among integration practices benefit performance While studies have shown the importance of integration in rent generation and appropriation, process [2].

Despite its potential for rent destruction, little attention has been paid to its development and better company performance. Nonetheless, research such as so, which looked at integration returns, showed that increasing integration indiscriminately may actually lower performance. Integration investments, like other kinds of investments, are susceptible to decreasing returns that may ultimately degenerate into negative returns if taken to extremes. If pursuing integration relentlessly isn't advantageous, neglecting it altogether is clearly not in a company's best interests. The question is intriguing and crucial: how much integration is ideal? We contend that the connection between integration and manufacturing performance is multivariate and nonlinear in nature, with unique combinations of integration techniques yielding better rent. As a result, the structure of integration efforts may be as significant as the programs themselves in determining manufacturing performance heterogeneity. We also believe that, contrary to the prevalent notion that "more is better," circumstances may need a decrease in efforts [3].

To investigate these problems, we use a variety of theoretical frameworks. First, the resource-based viewpoint is utilized to promote a configurationally view of integration, implying that it is the performance synergies that arise from particular arrangements of practices that count, not the effect of isolated practices. Second, the principles of transaction cost analysis (TCA) are used to describe the mechanism by which integration increases performance heterogeneity from a theoretical standpoint. TCA indicates that integration may help save costs and improve performance. Finally, we use institutional isomorphism theory to illustrate why integration may be detrimental to a company. The article offers an intermediate stance in integration projects based on these theoretical frameworks, explaining why curvilinear returns may be predicted in the connection between integration and performance.

The research is groundbreaking in that it looks into whether excessive investment in integration practices can be harmful. This raises the question of what constitutes a "optimal profile" of integration practice investments. We investigate this in depth using industry data and well-established research methods. This research makes a major contribution to the body of knowledge on supplier integration. We propose and test the hypothesis that performance variability stems as much from the choice of specific supplier integration practice configurations as it does from the character of a certain supplier integration practice. Our main goal is to see whether there are any trends in supplier integration methods that cause performance heterogeneity. As a result, we create an initial set of supplier integration techniques and highlight problems of sequence and synergy among them, both for immediate consideration and future study.

We go on to look at the circumstances that led to the formation of such ideal practice setups. Finally, we present a novel approach to integration research based on a technique that has some significant benefits over traditional methods. The discrete manufacturing sector is the empirical context for our research.

1.1.Integration of suppliers

The awareness of interdependency drives integration. The issue in previous, more vertically integrated periods was getting different functional divisions of a business to work together to

achieve corporate objectives. Companies must integrate operations across partners and supply chains to successfully deliver goods to the market, since growing parts of product value are partitioned to entities outside the company. Supplier integration is defined as a condition of syncreticism among an organization's supplier, buying, and manufacturing components. A number of supply chain management studies have focused on integration as a theme. Customer/market integration information integration, logistics and distribution integration, and purchasing integration are all examples of supply chain integration. The emphasis of this article is on supplier integration. The main emphasis on intra-company and supplier base integration distinguishes it from the wider notion of supply chain integration [4].

Technology initiatives like electronic data interchange (EDI) and web-based integration systems, applications software like enterprise resource planning (ERP) systems and supply-chain-optimization (SCO) software, and relational capital development initiatives like cross functional involvement, supplier relationship development, and joint problem solving are all examples of integration mechanisms. Not all resources provide lasting value in the resource-based view (RBV) paradigm. It's critical to distinguish between resources that can generate long-term rent and those that can't. Such resources, in addition to being valuable, will provide the firm with long-term benefits because they are rare and, above all, anima. In terms of replication or substitution. Integration can be achieved using technological resources such as EDI systems or knowledge-generating resources such as cross-functional teams or group problem solving.

The former usually entails a specific and well-defined product that can be contractually protected, or else necessitates significant complementarities or historical endowments for competitors to replicate. The latter is a form of knowledge that is largely tacit, socially complex, temporally demanding, limited in mobility, and difficult to decipher and codify [5]. Intangible knowledge-based resources are more likely to contribute to competitive advantage and are less susceptible to imitation. Rents accumulate when resources and capabilities are resistant to replication by competitors, according to RBV.

As a result, we concentrate our efforts on the knowledge-creating and knowledge-based components of supplier integration. What is the various knowledge-based components of supplier integration, and how do they interact? Should they be considered a synergistic unit. Supplier integration is accomplished through a combination of internal purchasing–manufacturing and external supplier-related activities. Internal purchasing–manufacturing integration was co-opted into the scope of supplier integration for a variety of reasons. With today's outsourcing trends, a concept known as "co-makership" considers the supplier as an extension of the customer's factory, aiming for "seamless end-to-end" continuity between production, purchasing, and the supplier. Purchasing serves as a vital link between manufacturing and the supply chain, interpreting and communicating product plans and production requirements to suppliers while also allowing manufacturing to stay informed about supplier technologies, capabilities, and limitations. Internal cohesion and coordination are required as a pre-requisite for mutual interdependence between intraorganizational and interorganizational integration. Purchasing–manufacturing integration facilitates the access, transfer, and utilization of explicit and tacit firm-specific knowledge to purchasing from a knowledge-based perspective [6].

2. DISCUSSION

The findings back with our hypothesis and provide empirical evidence to the predicted curvilinear connection between supplier integration and performance. By distinguishing different negative utilities perceived in deviations from an ideal configuration, our results contribute to the notion of decreasing utility in operations. According to our findings, integration may be a double-edged sword, with indiscriminate use resulting in performance deterioration. The rule of decreasing synergies seems to be applicable to integration usage. The timeliness of the interaction between internal and external integration may be of interest, in addition to the importance of creating the appropriate configuration of integration techniques. When external integration is still in its infancy, it is possible that internal integration initiatives will have the biggest effect on performance [7].

When sunk costs are minimal and process owners may change direction without substantial transition penalties, internal integration is the greatest option for matching supplier and buyer capabilities. External integration may include asset-specific investments in supplier partners, such as EDI interface systems and other capital expenditures. Changes in buying habits and tactics may be simpler to accept and achieve at an early stage when no major investments have been made. As a result, an exclusive or dominating strategy to external integration may potentially be detrimental to performance.

We provide information regarding supplier integration dynamics and recommended sequence of actions to the literature on supply chain integration. The benefits of interactions and complementarities across resources have been shown in the literature, with the multiplicative impacts of practices and capacities frequently outweighing the gains from individually deployed practices. Although ambiguity and limited reason prevent complete insight into such interactions, the structure of the basic set of activities provides some broad options. The engagement of buying in corporate strategy formula576 is one of the six integration techniques. The other four activities are part of an external integration strategy: collaborative issue solving, creation of collaboration institutions such as buyer–supplier councils, extensive bi-lateral interactions, and supplier development. What's interesting is how these various integration methods interact with one another.

Ell ram and Carr identified three streams of strategic buying research in their assessment of the literature. Surprisingly, all three streams agree on one thing: the significance of integrating buying into company strategy. When purchasing participates in the strategic planning process, sourcing and supply chain management issues are taken into account when evaluating strategic options; when purchasing coordinates goal setting with manufacturing, key purchasing decisions for example, value partitioning, new supplier technologies are coordinated with the firm's other strategic decisions. Internal integration efforts are aimed at integrating strategic buying processes with the company's competitive objectives. recall many paradigms in the strategic sourcing literature. The development of buying from regular, clerical purchasing operations to a proactive, crossfunctional, integrative role in the business is a recurrent topic.

As a company's buying department matures, it shifts its emphasis from functional to strategic excellence. To achieve this objective, internal integration procedures offer a formal interface mechanism between buying and other company activities. A lack of buying integration will lead to a misalignment between purchasing methods and production objectives. A high degree of buying integration, on the other hand, will result in a greater alignment of purchasing methods

with manufacturing objectives, which will lead to increased performance. This is in stark contrast to the buying literature's conceptual frameworks that place purchasing integration as the last step in a firm's purchasing development Freeman phase IV stage" and Rack and Long's integrative" phase. Internal integration activities seem to need to be undertaken a priori or concurrently with the adoption of external integration techniques. In the supply chain literature, similar reasons for the desirability of concurrency in buying activities have been made. Internal integration may therefore serve as a catalyst in the development and deployment of external integration practices, creating and sustaining a strategic connection between these practices and competitive objectives at critical phases of buying development. Buying executives must thus expressly resort to internal integration methods prior to an external integration effort to guarantee the strategic relevance of purchasing activities with the supplier base [10].

What is a supplier integration profile that has been properly calibrated and, if Misfit is found, what can managers do to minimize it Is it true that Misfit in one practice has distinct consequences than Misfit" in another these are important topics to investigate.

Responding to the first question may be influenced by a variety of variables that were not explicitly included in this study owing to a lack of data or a small sample size. One might argue that the "optimal" degree of integration varies by industry, product life cycle, and manufacturing strategy [8]. The extent and depth of integration efforts would undoubtedly be influenced by a valuenetwork's competitive environment. Supplier integration has become a significant and competitive advantage as competition has evolved from intra-industry fights to struggles between whole supply chains. We created an "ideal" profile of supplier integration procedures and calculated the aggregate performance effect of departures. This specific combination of integration techniques cannot be used as a universal standard or template for blind replication. However, there are several signs that our profile is fairly robust: our sample included a diverse range of manufacturing industries, and our measure of deviation from the "ideal" profile ('MisFit') was consistent across different production process types, a proxy for industry type, as well as different production strategies. 6 In reality, managers would choose an "arrow core" of integration techniques in their strategic competitive area and create an "ideal" supplier integration profile for benchmarking and replication. A gap analysis would identify deviations from the profile of integration practices (both good and negative), and steps would be made to address them [9].

3. CONCLUSION

We've tried to respond to two key issues about supplier integration: How do some businesses outperform others when it comes to supplier integration? Is it possible that any of their success may be ascribed to them Regarding the way integration efforts are put together Rather than the substance of the activities, it is the way they are structured that is important. We came up with some general responses. We discovered that performance variability stems from both. Content and organization Supplier integration that works may be achieved by recognizing individual differences Practices of integration linked to performance and locating and installing such a configuration. Activities that are (are) specifically linked to optimal performance. The second point is more interesting.

About the consequences of over-investing in supplier integration According to our findings, a balanced approach toThe ideal path to performance is via supplier integration. Investing in supplier integration is a wise decision. ItHowever, it may be imprudent to continue in this

manner. Investing in a non-selective manner conceptually (and empirically), a stance in the middle exists. The ‘ideal' profile of synergistic integration investments to get the best results without a doubt, such ‘ideal' situations exist. Although the logic of equifinality suggests such configurations are not unique, our results indicate that they do exist. Probably in a variety of forms, depending on the situation. Industry and market conditions the notion of an "ideal" profile clarifies synergy. To be had in integrating decision-making it gives you a lot of options. Decision-makers may use a composite, multivariate benchmarking tool. The non-linear connection between ‘Misfit' and ‘Failure to Fit ‘and performance, underlines the need of recognizing Investment trends in integration for competitiveness analysis and benchmarking In theory, the concept of The notion of ‘domain' is brought to life through ideal profiles.

Companies use ‘navigation' to develop operational strategies that fit environmental circumstances the research has several caveats and limitations. The emphasis of our study was on a major supplier As a consequence, the outcomes are out of the ordinary. Interactions with less important aspects of the organization supply-base. We don't claim that the collection is complete. The practices shown as the study's "ideal profile" isgeneralizable outside the study's sample scope Awe may have made a hold out with a bigger sample. For cross-validation, take a sample. Replication in other countries surroundings would help to solidify the ideate concept of 'optimal' profiles is valid. Furthermore, our Purchasing integration techniques are not treated in the same way. Over the course of many investigations, a set of findings emerged. It’s possible that new integration techniques may develop that can be considered to formatively depict the supplier's 'arrow core ‘Practices of integration that are resistant to product differences as well as business. We basically demonstrate that the concept of a ‘ideal' is a fallacy. The degree of supplier integration is conceptually sound. This is backed up by actual evidence. This discovery has the potential to Future study on supplier-supplier relationships will be sparked. Supply chain integration and the broader concept integration, as well as the ability to locate and create Supply chain profiles that are ‘ideal' for long-term competitiveness advantage.

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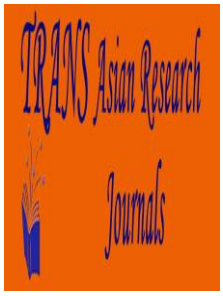

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FEATURES OF TEACHING THE DISCIPLINE "INFORMATION TECHNOLOGY IN EDUCATION" IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

The article discusses the features of teaching the subject of information technology in higher education, the conditions necessary to increase the effectiveness of teaching the subject, the problems associated with teaching.In the process of teaching the subject "Information Technology in Education" it is necessary to develop students' thinking, to gain their understanding of the role of computer science in the development of society, its importance in the social environment and professional activity. The subject of computer science is a new science in comparison with others, and its application in practice changes the direction of material and spiritual activity of man.

KEYWORDS: *Information, Computer Science, Information Technology In Education, Computer Technology, Problems.*

INTRODUCTION

Paragraph 4.4 of Annex IV to the Decree of the President of the Republic of Uzbekistan dated February 7, 2017 No UP-4947 "On the Strategy of Actions for the further development of the Republic of Uzbekistan" related to development priorities . ensures the development of the social sphere, education and science. It is noted that the system of continuing education has been further improved, and the policy of training highly qualified personnel in accordance with the modern requirements of the labor market continues. This, in turn, places a great responsibility on higher education teachers.

In this regard, the formation of knowledge, skills and abilities of students in the disciplines and their professional training is an urgent task. Having sufficient knowledge of students about their future professions and becoming qualified specialists will help to determine the future of our country.

In the process of teaching the subject "Information Technology in Education" it is necessary to develop students' thinking, to gain their understanding of the role of computer science in the development of society, its importance in the social environment and professional activity. The subject of computer science is a new science in comparison with others, and its application in practice changes the direction of material and spiritual activity of man. The individual is an active subject in society, so it is necessary to study the consequences of the impact of computer science on man, taking into account and analyzing various aspects of informing society.

The subject of "Information Technology in Education" is an integral part of the subject of informatics, which is aimed at solving problems such as processing data found in all areas of human activity using hardware and software tools and methods. Therefore, problems related to informatics in general can be divided into 3 groups: 1) current problems of informatics, 2) philosophical problems of informatics, 3) problems of informatics.

1. Current problems of computer science may include special data processed by us, the creation of a programming language, information structure, units of measurement of information and their interpretation, as well as information modeling.

2. Philosophical problems of the science of "computer science" include questions of a philosophical nature: "What is computer science?", "What is information?", "What is the relationship and interaction of computer science with other objects and sciences?"

3. Information and philosophical problems of computer science means questions explaining the terms of informatics, theses and terms that are part of the philosophical categories related to the structure of information. In the process of teaching computer science, students gain the necessary understanding of the subject and expand their knowledge.

Because in teaching, understanding science, knowing, as well as the formation of new knowledge are philosophical processes. Education in the field of science, the assimilation of new information by students, shapes their rational knowledge. Our compatriot Abu Nasr Muhammad ibn UzlagTarhan, who was engaged in creative work under the pseudonym Farobi in the 9th-10th centuries, said that the learning process consists of two stages - mental and emotional perception, in particular, the process of cognition. The two stages are rational cognition and emotional cognition. These stages cannot be added without information and therefore information is an element that forms the basis of knowledge.

In his book The Dignity of Science and Art, Farobi emphasizes that the process of knowing nature is infinite, that knowledge of ignorance is the primary path to perception, and that you can achieve results by identifying the cause, and on this basis to further expand knowledge and deepening is available. Another compatriot in the Khorezmi an educational process paid great attention to the individual observations of students and the practical application of the acquired knowledge.

The object of study of information technology in the educational process includes: information, information processes, algorithms, computers, as well as hardware, software, etc. It is known that informatics is the collection, storage, processing of data using computer technology, analysis, evaluation, transmission and individual decision making.

By information we mean the level of reflection or its impact and connection through all our senses in our future consciousness. Knowledge is formed directly in the learning process and it means the study of scientific knowledge or scientific knowledge. Scientists A.I.Mikhaylov,

A.I.Cherniy, R.S. Gilyarevsky gave the following definition of the term "scientific information": scientific data are logical data obtained in this mental process, which can be used in socio-historical practice to accurately reflect the laws of the objective world.

Based on this, we can say that, first of all, man receives "scientific information" in the mental process, which is applied in practical work and can serve as a basis for science. Second, “scientific information” is logical information that is transmitted through human thinking through logical thinking and is formed as a result of processing information. Third, it illuminates the world sufficiently objectively, and fourth, it must be put into practice. For information to be scientific, there must be a continuous connection between the data. Gathering information about natural and weather events in different regions of our country cannot be “scientific data”. Because it does not satisfy the third condition.

Based on the above concepts, it can be said that the knowledge that students need to study in computer science is based on scientific knowledge and appears in the sequence “mixed → information → knowledge → scientific knowledge”.

The main object in higher education is the student. The main task of the training is to provide teachers with the necessary information related to computer science and to transform it into knowledge by students through in-depth study, comprehension, memorization and, if necessary, the formation of scientific knowledge through their application. in practice.

This process is led by computer science teachers on each subject. We see this in the example of the following topic: "Technology in MS Excel" in the process of teaching university students in the field of "School Management" These are: mathematical calculations, performing complex calculations, working with mathematical formulas, converting table data into a graphical view (diagram), the importance of using Excel, ya ' The ability to provide relevant information using the program.

The information given to students during the teaching of the topic is displayed on the screen and explained using a computer, projector and electronic boards. Students will be provided with all the necessary information on the topic using information and communication technologies. In these processes, data based on clear evidence provided by the teacher is converted into data. During the course, the topic is explored in the above order, and as a result of students' independent practical and laboratory work, using the Excel program tasks related to the work of the principal, the deputy directors for the management of the educational process school, e.g. the development of curricula, lesson schedules, the organization of science Olympiads, as well as the mastery of the sequence of their implementation, the data become knowledge.

Students will be able to perform tasks related to school management based on the knowledge they have acquired during the lesson, find solutions to problems encountered with the help of textbooks and the Internet, and ensure that the knowledge gained becomes scientific knowledge.

Consecutive study of topics by students in this order and their application in practice leads to an increase in their interest in science, to deepen their knowledge.

Therefore, teachers of higher education in the field of "Information Technology in Education" have a big task:

- Clearly define the purpose of the topic;
- Highlight the main concepts being studied, based on the purpose of the topic;

● Provide students with content relevant to the basic concepts using information and communication technologies;

● Assignment of relevant tasks in practical and laboratory classes;

● Supervise the study of the topic by students;

● Work with students who have not mastered the topic.

Students' responsibilities include:

● Study of data and information provided by the teacher;

● Implementation of theoretically studied concepts in practical and laboratory classes with the use of information and communication technologies;

● Analyze problems in the course of tasks and try to solve them;

● Use of textbooks, Internet sites to solve problems, as well as to make individual decisions;

● Write reports on the tasks performed and draw personal conclusions.

Teaching the subject "Information Technology in Education" in all areas of higher education, today the use of computer technology in science and education contributes to the development of the education system. As a result of in-depth study of this subject, students can gain in-depth knowledge in the field of computer technology and apply it in their future professional activities.

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THE EFFECTIVENESS OF ENERGY TECHNOLOGIES IN THE DIGITALIZATION OF INDUSTRIAL ENTERPRISES

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ABSTRACT

This article describes the energy efficiency of enterprises through the digitalization of technologies. Technological efficiency ensures the sustainability of economic regulation of fixed costs. Energy efficiency makes it easier for a company to manage energy with energy diagnostics and monitoring and control software backed up with financial tools to meet customer needs. This kind of transition requires current production standards to save costs and ensure a cyclical life of the productivity of goods and services. After a detailed analysis of their energy consumption, we evaluate, design and install advanced solutions to optimize energy consumption in their buildings and industrial facilities using monitoring tools and controllers, ultra-high LED lighting, heating, air conditioning systems that reduce energy consumption, and high-efficiency industrial boilers.

KEYWORDS: *Digital Economy, Energy Efficiency, Technological Advantages.*

INTRODUCTION

The 21st century is the age of information technology, but information technology also has its reproducibility, and this can be seen in the production of every potentially developing company. Today, energy enterprises are transitioning to energy efficiency through the digitalization of enterprises. Energy efficiency has gone into efficiency not only as an indicator but also as an economic category.

Energy efficiency makes it easier for a company to manage energy with energy diagnostics and monitoring and control software backed up with financial tools to meet customer needs. This kind of transition requires current production standards to save costs and ensure a cyclical life of the productivity of goods and services. After a detailed analysis of their energy consumption, we evaluate, design and install advanced solutions to optimize energy consumption in their buildings and industrial facilities using monitoring tools and controllers, ultra-high LED lighting, heating, air conditioning systems that reduce energy consumption, and high-efficiency industrial boilers.

Energy efficiency offers a kind of advantage for companies: it provides direct control from both the user and intelligent grid optimization systems through our plant charging site. Give your customers and / or users access to the best charging solution with JuiceNet Enterprise available for Android, iOS and web platform.

According to Schneider Electric, electricity consumption will increase by 80% by 2040, putting the world in a paradigm driven by this electricity demand.

Faced with this scenario, the company is turning digitalization into an Alternative for development in modern energy management and solutions. In infrastructure and real estate, the firm recognizes the integration of technology tools into buildings of all sizes and curves as a critical element for improved energy management.

“A properly managed building saves up to 50% on operating costs and energy,” said Tanya Kalinka, Director of Digital Energy at Schneider Electric in Mexico and Central America. “We estimate that 82% of buildings around the world can improve their energy efficiency, which opens up an area of opportunity for their owners.”

In addition, the brand has identified three pillars and characteristics associated with the energy digitization of buildings:

- Simplicity in technology: defined by standardization and mobile technology

- Energy efficiency

- Productive digitization: one where an Internet of Things (IoT) enabled service generates savings of about 20% per year

Speaking of the company, a proposal that offers customers the ability to transform their buildings into comfortable, sustainable and efficient spaces is EcoStruxure Building Operation. This platform enables real estate to be monitored, scaled and secured in a digital and intelligent scheme through three levels of operation: connected products, border control and analytics and services.

With EcoStruxure Building Operation, we want to maximize the performance of our clients' assets by transforming them into engaging, functional and connected spaces. The result is a building that functions properly, lowers operating costs, and has predictive maintenance analytics. All these features enable our clients to make strategic decisions based on reliable information, which ultimately increases the value of their assets.

Schneider Electric has released the Global Digital Transformation Benefits Report 2019, which provides concrete evidence of the power of digitization across the spectrum of global industry, commerce and the public sector. This proof takes the form of deep, quantifiable business benefits from a repository of 230 client projects the brand has completed over the past five years in 41 countries, all of which use the EcoStruxure architecture and platform.

The purpose of this report is to provide readers with a useful and realistic guidance on the potential of digital transformation in energy management and automation. At the heart of this report are 12 key business benefits of digital transformation, which fall into three categories, each of which is essential for effective market competition: capital cost (CapEx), operating cost (OpEx), and resilience, speed, and productivity. The report focuses on four key sectors of the economy: buildings, data centers, industry and infrastructure, which will revolutionize the way people live, work and play.

The evidence presented in the report confirms in the market that digital transformation is a costly capital investment proposal that involves new systems and complex integration into existing processes. The client projects examined in the report prove the opposite.

Research shows that digitizing engineering processes, for example, can save businesses and organizations an average of 35 percent in capital expenditures and time optimization. In addition, commissioning costs for new systems and assets can be reduced by an average of 29 percent.

The study also shows that digitization using Internet of Things (IoT) technology can lead to significant savings in operating costs, resulting in improved efficiency, reliability, security and resilience. Companies and organizations report an average energy savings of 24 percent as a result of digitization.

In industrial applications, digital transformation enables companies to do more with less - more productivity with less energy, fewer materials, and fewer work hours. The productivity gains - up to 50 percent - are the result of efficiency in energy management and automation throughout the value chain, from IoT-enabled tracking to automated production lines.

The global report includes a PROJECT IN Mexico with the Mexican Oil Company (PEMEX), a state-owned oil company, which has decided to leverage the digitization opportunities with a project to upgrade its natural gas metering sites. SCADA International, Schneider Electric's partner in the System Integrator Alliance, has installed SCADAPacks, intelligent remote terminals, providing the ability to check the volume of gas flowing through its pipes in real time, allowing them to better see the performance of their system. The benefits of this equipment include simplified configuration and historical reporting, guaranteed replacement equipment, and improved operational efficiency through intelligent maintenance.

Schneider Electric began its digital transformation journey several years ago. In 2009, Schneider Electric launched EcoStruxure, its open and interoperable architecture and IoT, plug and play platform. Now, with cloud and digital services, EcoStruxure delivers increased value in security, reliability, efficiency, resilience and connectivity. EcoStruxure leverages advances in IoT, mobility, discovery, cloud, analytics and cybersecurity to deliver innovation at all levels, from connected products, edge management, and applications, analytics and services. EcoStruxure has been deployed to over 480,000 sites, supported by over 20,000 system integrators and developers, connecting over 1.6 million assets under management across over 40 digital services. Based on EcoStruxure, 45 percent of Schneider Electric's global sales in 2017 were IoT.

The broader story of the power of digital transformation in energy management and automation follows from this report: as companies digitize both energy management and automation, they work together to deliver even greater and unprecedented value.

Digital transformation is the only way to ensure consistency and efficiency across the entire company. Technologies such as the Internet of Things, artificial intelligence and big data analytics are making companies more efficient and innovative, increasing their competitive advantage. The report says many businesses and organizations need robust authority to manage the complexity of unlocking the full potential of digital transformation. Powered by EcoStruxure, these technologies leverage the power of digitization, enabling our customers to be more efficient, secure, reliable, connected and resilient leaders in the new digital economy.

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FOREIGN EXPERIENCE IN THE DEVELOPMENT OF INNOVATIVE ACTIVITIES OF ENTERPRISES IN THE ENERGY INDUSTRY

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ABSTRACT

The article examines the features of foreign experience in managing innovative activities in energy enterprises. The need to remove special attention to the innovative development of energy enterprises in the context of the transition from a monopoly structure to a competitive model of the industry. Traditional strategies have focused on the regulator, capital investment, and customer service. Typically, these strategies are focused on regulatory compliance rather than market demand. Accordingly, energy companies preferred to proceed with caution and avoid taking on unfamiliar risks. However, the development of the structure of electricity and gas markets, as well as the acceleration of transformation, mean that conservative approaches to strategy development are not able to effectively position the energy sector in the economy of the future, the contours of which are still being formed.

KEYWORDS: *Energy Companies, Innovation Management, Energy Industry.*

INTRODUCTION

Over the past 30 years, electricity and gas markets around the world have changed dramatically as the role of market forces in the supply and distribution of energy has increased. Markets have opened, competitors have emerged, businesses have become more rational in their operations, companies that have long been present in the sector have merged, technologies have been improved, and consumers have begun to experiment with new functions.

Today, in a changed industry that retains its inherent reliability, the processes of shaping a completely different future for the industry itself and for its stakeholders are underway. Some international energy companies have already moved far from their previous business formats.

Traditional strategies have focused on the regulator, capital investment, and customer service. Typically, these strategies are focused on regulatory compliance rather than market demand. Accordingly, energy companies preferred to proceed with caution and avoid taking on unfamiliar risks. However, the development of the structure of electricity and gas markets, as well as the

acceleration of transformation, mean that conservative approaches to strategy development are not able to effectively position the energy sector in the economy of the future, the contours of which are still being formed.

Tomorrow's strategies need to be focused, aggressive and consistent despite the uncertainties. When developing them, it is necessary to take into account that insufficient awareness of the vector of transformations and their results should not limit the ability to accept all the challenges that will arise in the course of the sector's development in the future.

Successful market strategies are not limited to the largest energy companies many smaller businesses are strategically well positioned. However, the actions taken by the energy market leaders provide some insight into how the electricity sector can develop and what leverage is in place to deliver valuable and long-term market and financial results.

In addition, changes are hindered by the process of energy supply itself, which by definition is conservative, due primarily to the focus of energy companies on meeting the standard needs of the economy and the social sphere in energy resources. The rigid technological structure of the electric power industry, which does not allow deviations, also contributes to a decrease in flexibility in terms of mastering modern technologies and an orientation towards a universalized approach in solving industry development problems.

Another feature of innovation in the energy complex of different countries is the dependence of the directions of its implementation on the availability and cost of certain fuel resources, climatic conditions, requirements of national legislation on environmental preservation and other factors. This explains a certain differentiation of the priorities of innovation activities of foreign energy companies, the general range of interests of which covers a fairly wide area of scientific and technological development.

It should be noted that in recent years in the economies of many countries, conditions are emerging, under the influence of which the innovative development of their national energy systems is reaching a qualitatively new level. On the one hand, there is a general trend in the world of an increase in the cost of the main types of fuel for power plants and a decrease in its reserves, accompanied by a constant increase in demand for energy. According to the International Energy Agency, by 2030 the needs of the world economy for energy resources may increase by 55%, reaching 17.721 million toe. At the same time, global electricity consumption will increase even more rapidly, reaching the level of 29.737 TWh by 2030. All this leads to a significant increase in interest in improving traditional technologies for energy production and predetermines an active search for cost-effective areas for the use of renewable energy sources.

On the other hand, with the development of high-tech industries in the world economy, a change in the nature of demand in the domestic sector due to the growth in the use of digital technology, the requirements for the quality of the organization of the energy supply process itself are increasing, which, in turn, stimulates the emergence of a new generation of energy systems with improved characteristics. Reliability and efficiency of functioning.

These circumstances predetermined the emergence of innovative systems in the electric power industry, the structure of which is of a network nature, as evidenced by the wide geography of location and the institutional heterogeneity of their elements, as well as the wide range of ongoing innovative developments. The initiators of the creation of such network formations are transnational energy companies, whose scale of activity allows not only to concentrate

significant financial resources, but also to determine the optimal directions of their investment, creating the basis for flexible and operational management of the innovative development process.

The central element of such innovative networks is the internal research units of the largest energy companies, which, on the one hand, are aimed at realizing their own potential for scientific and technological development, and, on the other hand, they search for innovative developments created by third-party organizations and scientific teams.

The focus on using the results of external research is explained by the technological complexity of the electric power industry, which limits the ability of energy companies to independently carry out innovative developments across the entire spectrum of priorities for their scientific and technological development. At the same time, each major energy producer is interested in possessing unique competencies that provide him with a competitive advantage in any technological area, which necessitates his own research centers.

Unsurprisingly, at this point, utilities are taking on a fairly similar strategic action, as has usually been the case in the power sector. But the degree of strategic change and the corresponding levels of investment can vary significantly.

Over the next few years, we will see a dividing line between the most aggressive and innovative energy companies in the Top 40 and other peers. The degree of delimitation will allow investors to assess the value of the business of energy companies in different ways based on their strategies and achievements in the market.

Today, the Top 40 energy companies in Europe are outperforming their competitors in North America and the Asia-Pacific region, largely due to early policy changes and restructuring measures.

However, the Top 40 companies from North America and Asia-Pacific are following the same path as their European counterparts.

New business areas such as solutions and services, renewable energy, gas (and sometimes water) infrastructure, and distributed energy naturally create growth prospects.

In the coming years, the Top 40 leaders will include more acquisitions with the required competencies in their strategic initiatives, will increasingly forge partnerships with equipment manufacturers and solution providers, and innovate more in their business models.

The strategies of Top 40 companies provide a deep understanding of the sector's development vector. Although the vector of development seems to be well-defined, there is still the possibility of unplanned changes caused by possible changes in the current policy, accelerated technological progress and the impact on the market of new patterns of consumer behavior. All factors will contribute to the adjustment - both planned and sometimes unforeseen - of the outlined strategic course.

In recent years, the experience of countries around the world has shown that every strategic measure helps to overcome the problems in the development of the national economy. In particular, Eastern countries such as China and Japan will increase the economic efficiency of enterprises operating in the energy system by developing and expanding the green economy. For example, they are developing a green economy through the use of biotechnological devices, increasing the productivity of natural products (running greenhouses with modern technologies),

organizing production without violating the laws of ecology and the environment, and seeking ways to avoid polluting technologies. Its efficiency for energy companies is reflected in the production of energy from waste, the efficient use of wind and hydropower due to the improvement of the environment, and the expansion of solar energy production.

The experience of enterprises in the energy system in European countries shows that great attention is paid to improving efficiency through the development of digital technologies. In Germany, for example, special digital panel rugs are installed in the most crowded places, producing energy that is concentrated through the steps that walk through that rug. Many European countries are organizing construction projects to implement the same technology in parks.

In the U.S., however, companies operating in the energy system are to be commended, largely as a result of their practice with so many technologies. For example, recycling, redirecting waste to energy sources, wind energy storage devices in motorcycle fields, as well as redirecting to an energy source through the effective elimination of tornadoes in the event of a tornado.

The above technologies have been widely used in recent years in the construction of buildings and structures. Various new residences in the United Arab Emirates, using only solar energy, are widely used by electric cars for mountain trips in Japan.

Uzbekistan is opening the door to the flow of these technologies through the organization of various innovative projects, government programs and scientific competitions. Mechanisms to encourage investment and innovation projects to implement preferential, simplified and localization programs of the credit system are widely used in our country. In conclusion, it should be noted that the study of technology that corresponds to the infrastructure of our national economy, the selection of the most effective and the emphasis on its improvement in our country will help our country to join the ranks of developed countries.

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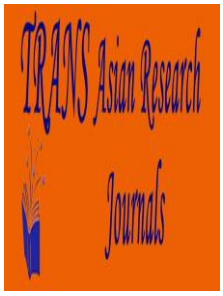

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THE USE OF SMART PHONES IN OPHTHALMOLOGY

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ABSTRACT

Health care workers are increasingly using smart phones. Ophthalmological apps are readily accessible, and they may transform smartphones into sophisticated medical equipment. Smart phones may be helpful for evidence-based medicine, professional education, mobile clinical engagement, patient education, illness self-management, remote patient monitoring, and administrative tasks. Several apps are available to evaluate sharpness, colour vision, astigmatism, pupil size, the Amsler grid test, and other ophthalmological tests. For capturing pictures of the anterior and posterior eye segments, smart phones may be helpful ophthalmic equipment. With the usage of smart phones, professional literature and instructional information for patients is readily accessible. Smart phones are capable of storing large amounts of data and are helpful for long-term monitoring while maintaining patient anonymity. The use of smart phones as diagnostic instruments, in particular, is not standardized, and the findings should be carefully weighed. Smart phones are the future of ophthalmology and medicine because of their innovative role in research, teaching, and information exchange.

KEYWORDS: *Communication, Education, Eyes, Ophthalmology, Smart Phone.*

1. INTRODUCTION

A smartphone, often known as a smart phone, is a multipurpose electronic device that combines a mobile phone with sophisticated computing and networking capabilities. Smartphones offer sophisticated capability and the capacity to run numerous complex apps, browse the web, send and receive e-mails, produce and display pictures, videos, and office documents in addition to phone calls and text messaging. Smart phones have become more popular because of technological advancements, which have resulted in a greater number of accessible apps and lower prices. In 2012, there were an estimated 1-billion smartphone users worldwide, which is expected to rise to 1.75 billion in 2014[1].

Smartphone usage have increased significantly among health professionals, from an estimated 30% in 2001 to 64% in 2009. Currently, 86 percent of health professionals use their smartphones on a regular basis for a variety of reasons. Many commonly used tools for clinical assessment and education may be combined into one simple, portable interface for smart phones. Smart phones may be used for evidence-based medicine, mobile clinical communication, patient education, illness self-management, and remote patient monitoring thanks to medical apps[2].The goal of this essay is to show how smart phones may be used in ophthalmology in a variety of ways.

1.1 Applications of Smartphones in Ophthalmology:

Ophthalmological apps are transforming smart phones into medical instruments, with over 342 distinct ophthalmological applications accessible now. Between 2009 and 2012, there was a 9-fold rise in the number of surgical apps accessible for smart phones. There are now 621 surgical smartphone apps accessible, with 121 of them devoted to ophthalmology. The most popular platforms among healthcare workers are Apple's iOS and Google's Android. According to certain polls, the Apple iPhone is the most popular smartphone among ophthalmologists across the globe. There are a variety of smartphone apps that offer surgical exposure and familiarization with typical operational procedures, ranging from simple flashcards to virtual surgery apps[3]–[5].

The intended user may split smartphone apps into three categories: healthcare professionals, medical or nursing students, and patients. In the area of ophthalmology, smart phones may serve a variety of purposes, which can be divided into the following categories:

- Tools for evaluating patients.
- Visual aids for patient education.
- Information and education for health-care professionals.
- Patient records–tools for administration.

1.1.1 Instruments For Assessing Patients:

Different diagnostic instruments are used in ophthalmological examinations. These exams are simple to conduct in professional settings, but in situations such as outpatient or inpatient consultations, as well as emergency department visits, smartphone apps for various visual tests may be extremely helpful.Many apps may be used to evaluate patients.For pre-school children and ignorant adults, these apps may evaluate visual acuity using the Snellen visual acuity test or contemporary interactive visual acuity tests. Color vision, astigmatism, pupil size, Amsler grid test, oculomotor reflexes, a Worth 4 dot test and accommodation targets, red desaturation test, and OKN drum simulator are among the uses. It is worth noting that fluorescein light and pen light may be helpful in less-than-ideal situations. The examiner will have to raise the screen brightness to maximum and decrease the ambient light to minimum in these circumstances. Smart phones may be used as paediatric fixation targets since they are bright, have motion and sound, and can be utilized to amuse children[6].One of the most popular apps is “Eye Handbook,” which includes nearly all of the testing instruments listed above, as well as “iSight test,” “Vision test,” “Macula tester,” and “Color blind test.”

Figure 1: The above figure shows theMagnify photo adapter[osa-opn].

Smart phones have becoming more popular for ophthalmic photography. Cameras on the new generation of smart phones have a resolution of 5 mega pixels or greater, allowing users to take high-quality pictures. There are various photo adapters for smart phones that allow them to be used as ophthalmic devices to take pictures of both the anterior and posterior eye segments. When using photo adapters, make sure the camera on your smartphone is aligned with the optical axis and near to the slit lamp eyepiece. Adapters for taking fundus pictures via an undiluted pupil may be attached to the "Panoptic Ophthalmoscope." It is also feasible to take a good photo of the retina using only a smartphone and an indirect lens. The examiner may see the smartphone display and collaborate with other practitioners to assess real-time pictures of the anterior and posterior eye segments, as well as record and share the results. Without a statistically significant difference from subjective refraction, a smartphone with a pinhole adapter (Near Eye Tool for Refractive Assessment–NETRA) may be used to assess refractive error (Subjective Spherical Equivalent). When interpreting the examination findings, the examiner–ophthalmologist should keep in mind that the testing instruments are not perfectly standardized, thus eye care professionals should rely on their professional judgment and expertise. Figure 1 shows the *Magnify photo adapter[7], [8]*.

1.1.2 Visualaids For Patient Education:

Patient management includes not only examination and therapy, but also patient education to enhance the patient's knowledge of ophthalmic illnesses and their processes. The use of smart phones for clinician-led patient education in illness prevention and management is easy and effective. Instruction papers, pamphlets, and films are examples of educational resources that may be used to help patients better comprehend their illness.Smart phones can reproduce high-resolution pictures, movies, and office documents that include a variety of medical-related information. High-resolution pictures of different eye conditions may help patients understand anatomy and pathology, as well as treatment methods and choices. Patients may download the app and the educational materials on their smartphone, study the information, and show it to friends and family, freeing them of the effort of translating often-complex ophthalmological explanations[9], [10].

Several apps provide a list of common eye diseases seen in daily ophthalmology practice, along with a brief explanation of clinical characteristics and treatment choices. These details may be given to the patient and his family or even emailed to them. In this manner, self–diagnosis may be possible in certain instances without the presence of a professional. The “Eye Handbook” and

"IKONION" patient education apps are now the most popular. Physicians may e-mail necessary education information to patients straight from their smartphones using the "Eye Handbook," which is a fantastic feature. Patients with severe visual impairment may utilize voice–activated assistant apps to help them with everyday tasks.With the use of the Global Positioning System (GPS), smart phones may also be used to track and monitor handicapped patients

1.1.3 Education And References For Health-Care Professionals:

Healthcare workers must continue to improve their skills. It is tough to keep up with the newest study findings when you just have a few hours available for professional growth. With the use of information technology, such as smart phones, the most recent data and conclusions are just a "click" away from practitioners. Angle anatomy, diabetic retinopathy, retinal holes, optic nerve oedema, and melanoma are all readily accessible classifications and grading systems. Several applications provide users access to clinical trial databases and literature searches in biological databases like PubMed/MEDLINE. "Pub Search" and "PubMed on Tap" are two of the most popular database search apps. These apps also enable you to share information with patients and co-workers.

Other smartphone apps include movies and color atlas pictures, which are very helpful in the training process and the development of surgical abilities. These apps may assist with patient follow-up, intraocular lens (IOL) calculations, and surgically induced astigmatism (SIA) calculations. A list of diagnoses not to miss, with definitions and differential diagnoses, a color–coded map of retinal drawings, questionnaires for frequently seen ocular diseases, and a review of benchmark randomized control studies in ophthalmology are just a few of the applications available.

1.1.4 Administrative Tools For Patient Records:

The number of smart phone apps that may be utilized in medical is steadily increasing. With the usage of smart phones, communication between doctors and hospitals is increasing all the time. In the area of ophthalmology, the dynamic interface offers a lot of promise for future development. Hospital Information Systems (HIS) applications provide safe access to patient data. These apps, such as "OsiriX" and "MEDITECH," allow for the safe transmission of information from a hospital's picture archiving and communication system (PACS) to another physician and from one location to another. Other relevant information may be transmitted as well, such as visual acuity and intraocular pressure readings, eye pictures obtained with a mobile or stationary ophthalmic camera, optical coherence tomography results, corneal topography images, or even the patient's entire electronic health record (EHR).

Tele-ophthalmology is the use of electronic communication and information technology to offer or assist a wide range of eye-care-related tasks. Smartphone apps allow real tele-ophthalmology to be used, and it covers a wide range of medical tasks, including diagnosis, treatment, prevention, teaching, and research.The transferred data may be examined in depth later or compared to prior results. Tele-ophthalmology allows eye treatment to be provided regardless of location or time. It is worth noting that certain apps that deal with coding diseases according to the International Classification of Diseases–9 (ICD–9) may be very useful and timesaving.

1.1.5 Smartphones And Distributed Eye Care:

The restoration of near-sightedness, which affects an estimated two billion individuals globally, is a basic illustration of this effect. Because current treatments require a skilled optometrist,

costly equipment, or both, only a small percentage of those patients have access to excellent eye care. Consequently, an estimated 517 million people suffer with uncorrected near-vision impairment that interferes with their everyday lives. Uncorrected far-vision impairment affects another 153 million people. Uncorrected refractive problems (vision poorer than 3/60 in the worse eye) are the second largest cause of blindness. Moreover, about 87 percent of those afflicted reside in poor countries. The cost of lost productivity due to uncorrected refractive error is estimated to be between US$88.7 and US$133 billion globally.

Smartphones have the potential to reduce these unnecessary economic and social costs by bringing basic diagnoses to places where there are no skilled optometrists or costly equipment. The Near Eye Tool for Refractive Assessment, or NETRA (Sanskrit for "eye"), is one noteworthy example, which utilizes a pinhole adaptor and software to measure refractive error (subjective spherical equivalent). Furthermore, the findings of NETRA do not reveal a statistical significance from the results of traditional subjective refraction examinations.NETRA is a project of the Massachusetts Institute of Technology's Media Lab that works with an ersatz version of the Shack-Hartmann acoustic sensor, an adaptive optics instrument used to characterize corneal aberrations and other optometric applications. In the clinic, traditional Shack-Hartmann systems utilize laser light reflected from the back of the eye; the laser and the Shack-Hartmann sensor are both costly and need precise optical alignment by a skilled operator. NETRA, on the other hand, utilizes a clip-on eyepiece and a smartphone display instead of an aiming laser light source, which saves money and even allows for self-evaluation while still giving data similar to clinical systems.

In this method, the individual stares at the phone display from a close distance and aligns (overlaps) patterns on the screen. The alignment task provides a measure of the optical imperfections of such areas since the light beams from these patterns travel via various parts of the visual system. The system calculates the relevant refractive error for myopia, hyperopia, and astigmatism after the patient performs this process for a few meridians with adequate pattern variation. The clip-on eyepiece is expected to cost $2.00 USD. Clearly, this approach may be extremely helpful in distant fieldwork or in rural or low-resource situations when there is no access to an ophthalmologist.The technique of divergent photo refraction, in which refractive correction is calculated from the shape and brightness of the crescent of light reflecting off the eye's inner surface, or fundus, is another way for determining refractive error. The camera flash on the phone is utilized to flood the retina with light. This may be used to rapidly evaluate the refractive condition of the eye in large groups of individuals, such as in poor countries, and among patient populations, such as the elderly and babies, where communication may be a problem.

2. DISCUSSION

The author has discussed about the use of smart phones in ophthalmology, Apps for ophthalmology are widely available, and they have the potential to turn smartphones into powerful medical devices. Evidence-based medicine, experts and business, mobile clinical contact, patient education, disease self-management, remote patient, and administrative chores may all benefit from smart phones. Sharpness, color vision, distortion, pupil size, the Amsler grid test, and other optometrists' exams may all be evaluated using applications. Smart phones may be useful ophthalmic equipment for taking photos of the anterior and posterior eye parts. Contemporary research and instructional material for patients are easily available because to the widespread use of smart phones. Smart phones can store many data and are useful for long-term

supervision while keeping the patient's identity hidden. The use of smart phones as diagnostic tools, in particular, is not standard, and the results should be evaluated carefully.

3. CONCLUSION

The author has discussed about the use of smart phones in ophthalmology, Smart phones have already had a significant effect on ophthalmology and general medical practice. Smartphone applications are becoming more widely accessible, and ophthalmologists are growing more comfortable with using them in their practice. Smart phones are the future of ophthalmology and medicine because of their innovative role in research, teaching, and information exchange.

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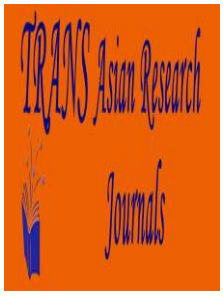

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THE BRIEF REVIEW ON THE STRUCTURE OF THE DRIVER SUPPORT IN AUTOMOBILE

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ABSTRACT

In today's society, injuries are more common than ever. It's past time for us to come up with a plan to stop it. Our article considers how to reduce the dreadful events that have such a huge impact on precious lives. We don't have a sophisticated system in India that would make it simpler to track occurrences. With this post, we've taken the effort to track the horrifying occurrences that are on the increase. Our article focuses on avoiding collisions on twisting roads, which are notorious for causing the majority of accidents since the driver on one side is oblivious of the car coming from the other. The first is scalability, or if the findings obtained from simulated driving data can be scaled to actual circumstances using real sensors. The output from real sensors, unlike the 'high-level situational awareness' that we receive from the simulator, will be unexpected and low-fidelity.

KEYWORDS: *Autonomous, Road Accident, Safety System.*

1. INTRODUCTION

Road accidents are the consequence of a complex interaction of variables such as the length of the road network, the number of vehicles on the road, the human population, and the enforcement of road safety regulations, among other [1]. Road accidents result in injuries, fatalities, disabilities, and hospitalization, all of which have major social and economic consequences throughout the globe. As a result, road safety has become a national and worldwide priority. From 4, 89,400 in 2014 to 5, 01,423 in 2015, the total number of road injuries increased by 2,5 percent. From 1,39,671 in 2014 to 1,46,133 in 2015, the projected number of people murdered increased by 4.6%[2].

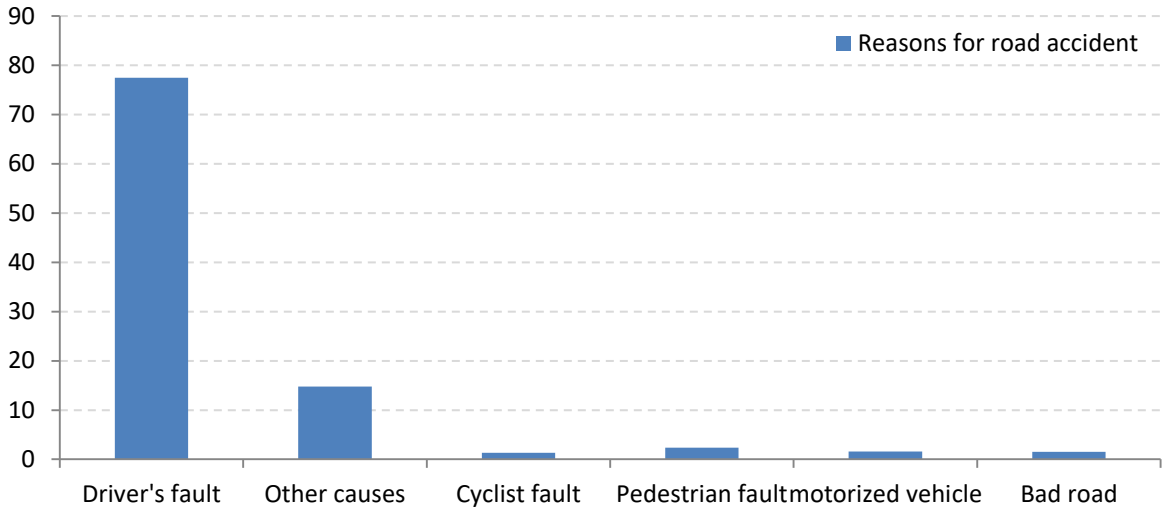

Figure 1:Reasons for accidents on road[3]

Accidents on the road have increased by 1.4 percent, up from 4%. The severity of the accident (number of persons killed per 100 occurrences) increased from 28.5 in 2014 to 29.1 in 2015. It also shows that there are 57 accidents and 17 fatalities every hour on average in our nation due to traffic accidents. In India, a traffic accident claims the lives of one person every four minutes. In India, severe traffic accidents occur every minute, with 16 people dying every hour on Indian roadways. Every day, 1214 road accidents occur in India. The state of Tamil Nadu has the greatest number of traffic accidents (figure 1).

1.1 Architecture ofthe System:

There are three main purposes of the driver assistance and safety warning system:

1.1.1 For safer and quicker driving, have suitable just-in-time information on the vehicle, the road, and the surrounding environment.

1.1.2 Passively notify the driver if his or her vehicle is in a hazardous state.

1.1.3 Warn the driver of potentially hazardous situations based on the vehicle's current position, orientation, and speed, as well as the route or surrounding conditions [4].

The driving agent serves two purposes. One is the driving assistance feature, which uses a high-acceptability method of drawing attention and revising driving operation suggestions while driving. Another feature is the reflection assistance function, which analyzes his or her driving habits and offers feedback in the form of good/bad driving scenarios, guidance remarks, and a short movie based on the assessment[5]. The driver agent uses these support systems to make the elderly aware of their own driving conduct and helps them to improve it. Figure 2 depicts the prototype driver agent's system setup. The system obtains driving operational data from the Controller Area Network (CAN) and facial direction via the use of a facial recognition software (face API, Seeing Machines). Furthermore, the agent uses onboard sensors and GPS/map information to determine the distance between the vehicle and obstacles such as a stop line and a pedestrian. The assistance material is determined by the control module based on the instructors' teaching model derived from the aforementioned data[6].

One of the most significant applications of artificial intelligence is autonomous driving. Autonomous cars are equipped with cameras, algorithms, and control systems and are intended to drive themselves with little help from human drivers [7]Continuous progress has been achieved, with some self-driving cars achieving outstanding outcomes. However, we agree that autonomous cars will take some time to become a reality. Meanwhile, smart cars, which are sophisticated driver management systems that are controlled by people, seem to be more promising [8].In this spirit, we're working on the Driving Advocate, an intelligent driver assistance system" (DA). Smart cars need a lot of the same technology as autonomous vehicles, such as camera, vision, and image processing systems, meaning and situation comprehension, mission modeling, and inference and decision-making capabilities. Designing an autonomous car, on the other hand, necessitates the use of external technologies such as user simulation, purpose detection, and human factors since the system must interact with the human driver. One of the challenges here is that each drivers' driving behavior varies widely, thus the driver assistance system must be able to react to each driver's unique characteristics [9].

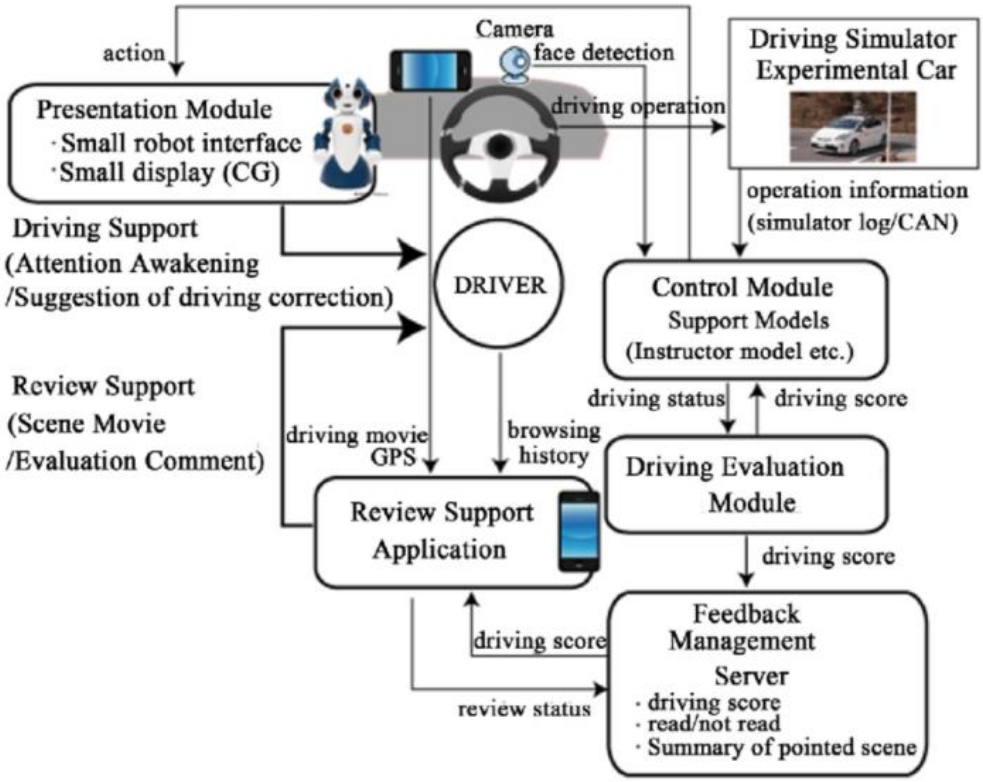

Figure 1: Structure of Driver-Agent System.

2. LITERATURE REVIEW

The driver assistance device was developed with two concepts in mind: car-to-vehicle mutual service and engagement to lessen the driver's workload and minimize the risk of injury. This addressed the question of whether such systems will lower driver morale or cause other issues of this type [10].

3. DISCUSSION

The driving agent has two functions. One is the driving aid function, which draws attention and revises driving operation recommendations while driving using a high-acceptability approach. The reflection aid function is another feature, which analyzes his or her driving behaviors and provides feedback in the form of good/bad driving situations, guiding comments, and a short movie based on the evaluation. These support systems are used by the driver agent to make the elderly aware of their own driving behavior and to assist them in improving it.The system uses a facial recognition program to collect driving operational data from the Controller Area Network (CAN) and facial direction (face API, Seeing Machines). In addition, the agent utilizes onboard sensors and GPS/map data to calculate the distance between the car and obstacles like a stop line and a pedestrian. The control module determines the support material based on the instructors' teaching model, which is generated from the aforementioned data.

Autonomous driving is one of the most important uses of artificial intelligence. Autonomous automobiles are vehicles that are outfitted with cameras, algorithms, and control systems, and are designed to drive itself with little assistance from human drivers. Continuous progress has been made, with some self-driving vehicles producing exceptional results. We do agree, however, that self-driving vehicles will take some time to become a reality. Smart vehicles, on the other hand, which are sophisticated driver management systems controlled by humans, seem to be more promising.

4. CONCLUSION

Safety systems are designed to prevent accidents and injuries by providing equipment that notify the driver of potential issues or halt collisions by enforcing measures and seizing control of the vehicle. Autonomous driving will be the future feature. The structure will be improved in the future, and the design will be used in advanced truck driver training. It would bring together a variety of approaches to adopting e-learning solutions, serious sports, realistic simulations with real cars, and simulator-based testing (both high-end and low-end). Individual acquisition of gained abilities is pursued throughout the training phase. This allows for more personalized learning methods and lengths. A key element of the definition is the pre-testing of drivers and the planning of training. Electronic stability control (also known as cornering break control), intelligent cruise control, and forward collision avoidance technologies are all available to less experienced pilots’. Frequent-Sleep Warning and Adaptive Headlights for Night DriversI'll wrap up this presentation by discussing a number of intriguing issues that we've encountered or may experience throughout the transition process. The first is scalability, or if the findings obtained from simulated driving data can be scaled to actual circumstances using real sensors. The output from real sensors, unlike the 'high-level situational awareness' that we receive from the simulator, will be unexpected and low-fidelity.

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IMPROVING ENERGY SUPPLY IN THE CONTEXT OF THE STRATEGIC DEVELOPMENT OF THE COUNTRY'S ECONOMY

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ABSTRACT

This article is a food in the country used in the countries of the world in the developmentof effective and efficient ways reflected the characteristics of the country, the use of internationalexperience of the selection proposal. The role of human resources in the efficient development of energy supply was also analyzed.

KEYWORDS: *Energy Supply, Engineers, Strategic, Resourcesaving, World Experience, Human Resources, Technological Modernization.*

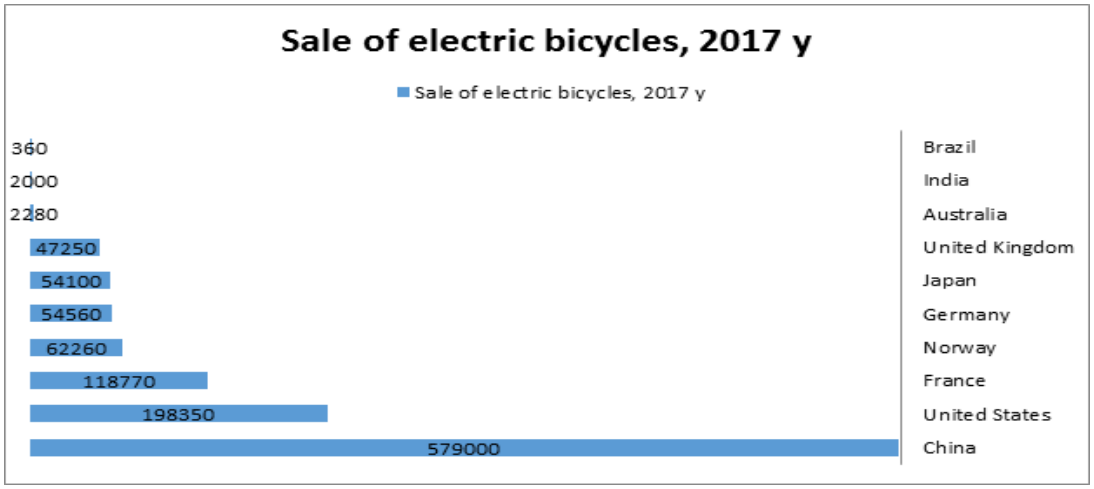
1. INTRODUCTION

See the power to put the modern economy in focus in the world. It is enough to give anexample of the proposal of the social layer in highlighting the importance of power supply. But justas any proposal has its own costs and labor, as in the case of energy supply, this issue is one of themost important aspects in regulating the economy. Eletr energy supply e provides growing shareof vertical services. Demand for electricity will grow in direct proportion to household income growth, and will also play an important role in the electrification of transport services, the electrification of services in related fields, the expansion of living conditions and the wide spread use of opportunities.

In addition to global environmental measures, including electricity, it has the largest share of industry in the world. Despite the fact that the growth of electricity is one of the main reasons for the extremely high level of global atmospheric missions in the energy sector in 2018, the commercial availability of various mission technologies did not negatively affect electricity consumption. But while attitudes toward electricity are growing, environmental transparency isachievedthroughacenturies-old pandemic, which means that people in most countries have stopped production as a result of a quarantine lifestyle. as well as the results achieved by chemicaltechnologies that cannot ensure the quality of environmentally friendly products. Although thistemporary situation does not affect the growth of the ecological taste of electricity,

it inhibits somenegative effects on environmental pollution. In addition, renewable energy plays an important roleinprovidingelectricityforall.[1]

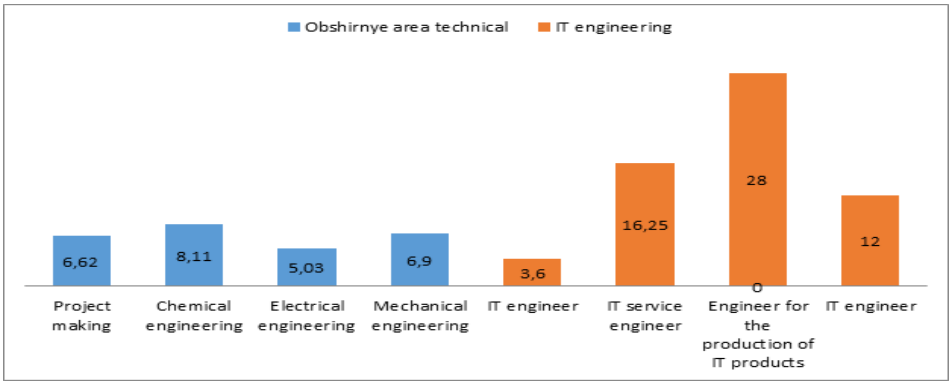
There is a joke among the Jewish people: the profession that causes the most disasters in theworld always pays a lot of money to its employees. This joke can also be used as a proverb in theeconomic language. The negative aspects of the environmental impact of electricity supply werementioned above. Energy is one of the highest paid professions. Seventh place in the ten most highly paid professions in the world is occupied by specialists in this field.The cartakes the first time, energy 7 places b will die in the near future, their first opportunity to stay after the forecast.This is due to the fact that in the near future a wave of refusal to use oil and gas products will beginin engineering. The reason for forecasting the future of electric power and engineering can be described by the following statistics (Figure1).



Saleofelectricbicycles,2017y

Source:ForbesStatisticalElectronicJournal,2017

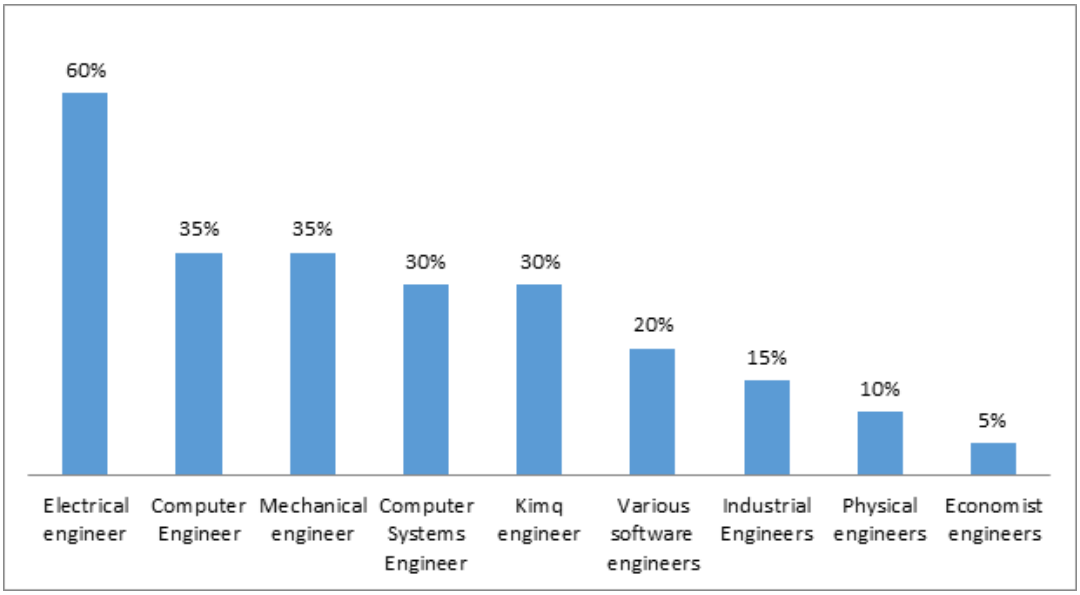
Electrical engineers have a unique reputation in manufacturing new and improved electronics,components and equipment. They also test and solve problems with existing electronics. Lectureengineers work to solve problems and provide internal structure and electronic acoustic wires tocars, robots, generators and a navigation system with so many products and systems working in.They also develop and assemble new products, test safety products, and oversee the installation ofcomponents.[2]



Manycreatetechnicaldrawingsandspecificationswithinstructionsandproperoperation.Thiswillleadt othecreationofacceleratedcentersoftechnopolisesandtechnologyparksfortheinnovation market. In the top ten most innovative products in the world, information technologyoccupies the first place, the textile industry takes the second place, and the third place is energy andalternative energy supply. [3] occupy the corresponding products (Fig. 2). To become an electricalengineer requires a bachelor's degree in electrical engineering. The salaries of electrical engineersrangedfrom$84,500to$128,610peryearin2018,accordingtoForb100magazine.[4]

We can cite the work of power engineers and their hard work on the example of worldstatistics.(3-figure).

Figure 3 Level of demand for professions when filling vacancies in enterprises around theworld(inpercent)



Source:https://yearbook.enerdata.ru/

Due to the demand for this profession among the countries of the world, high monthly salariesarealsocharacteristicoftheirtariffs.Accordingtointernationalexperience,intheimplementatio nof energy supply in our country, the concept of integrated socio-economic development of theRepublic of Uzbekistan until 2030 is included. The concept of sustainable economic development inthe future may depend on risks and threats, analysis of the main results of energiyata'minotdapotential in terms of the following conclusions: in the field of human resources, the rapidly growingconditions for the problem of employment in the creation of new production capacities in order tocreate favorable conditions for doing. The long-term nature of the decision is determined by thecurrent structural deformation of the country's economy, characterized by the backwardness of thetechnological base of key industries, the direction of export of raw materials and high levels of grossvalueaddedinagriculture,highenergyandresourcedensity.

First of all, when implementing power supplies, attention should be paid to the introduction ofdevices that produce electrical equipment. In this regard, countries such as China, Japan, the UnitedStates, Russia, Japan, India, even managed to use electrical devices in the sea and in the air. Theincrease in energy supply is associated with urban sprawl, population growth and

populationgrowth, as well as an increase in the number of production and service enterprises. However, in thecontextofthecountry'sstrategicdevelopment,thedevelopmentconceptprovidesfortheintroduction of energy equipment in the implementation of energy supply and heat energy, aconservation complex, small towns, gas processing plants together with closed heat supply systems.Andtheexpectedresultisexplainedbythefactthatitleadstolowerenergyprices.

The most useful aspect of observing international experience is that each country can applytechnologically,strategicallyapplicablepracticesdependingonitsclimateandgeographicconditi ons. In recent years, the United Arab Emirates has been striking the world with its largefacilitiesandnewsettlements.Duringtheconstructionofcitiesandbuildings,attentiontoenvironm ental issues and energy supply is taken into account at a high economic level. This solvedtheurgentproblemsofenergysupplyofcitieswiththehelpofsolarenergyandthecorrectorganizati onoftheworkforceinmaintainingtheergonomicsofshadedplacesandacleanenvironment in ensuring their environmental cleanliness. Of course, innovative technologies wereused at a high level. Our country has many advantages in using solar energy. It can be usedeffectivelyandefficiently.

ChangesinGermany'senergysupplyareexplainedbytheconceptofenergyshifts.Inaccordancewithth econceptofenergyrotation,theGermangovernmentunderstandsthepostpennyyotkazmovefromtheus eofiskopaemogouglevodorodnogotoplivaiyadernoyEnergyIpochti polnyy perexod on eyo vozobnovlyaemy istochniki. As part of this concept, for 2020 it isplanned to increase the share of electricity received from alternative sources to 35%, and in 2030,2040 and 2050 - to 50, 65 and 80%, respectively. [5] According to data at the beginning of 2019, theshare of “clean” energy will be more than 40% [6] of the generated electricity, the bulk of which isproduced in the solar and second energy sectors, which indicates a more active development of thisindustrythanwasplanned.

China has modernized all systems associated with this problem when it analyzes the economicinfrastructureofitslaboriouseffortstomaximizeenergysupply,determiningthatthemaincon sumersofelectricityareenterprisesinneedofmodernization,outdatedvehiclesandorganizations with outdated energy-saving equipment, and low-income populations. density. andenergy efficiency. However, since the environmental problem remains, it has been working for thepast ten years, moving on to the path of building eco-cities, paying particular attention to theimplementation of the acquisition process in relation to environmental funds.Singapore is also a country that has achieved unique successes in energy supply, and its experiencecan promise very effective and efficient results in the economic structure. The power supply of thiscountry includes systems specific to its segment: power supply to remote and isolated territories,commercial and industrial micro-grids, power storage systems, demand management, consumerservicesintheenergysectorasawhole.[7]

TheIndianexperiencehasbeenadaptedtothespecificsoftheprovincesandstates,thegeographicallocat ionandclimateofthevillages.Hydropowerisaccessibletoflood-pronepopulations, while wind energy works where the wind is efficient (hydro and wind are usuallylocatedclosetoeachother)andalsoprovidesolarenergy at almost all points.Development in the energy sector, companies need to restructure their experts - they should befocused on. Characteristics of equipment to ensure compliance with technical experts in the field ofskill management, analytical and commercial specialists who are entitled to demand his abdomen.This problem exists in all countries. This can be seen in the Colombian project on

energy efficiencyand the rational use of alternative energy sources. According to him, the emphasis on increasingintellectualinvestmentwillbestrengthened.

Older cadres in the field of labor and energy will become more and more to threaten progressin current work. This is only due to energy companies getting worse. This issue has also led toactions that run counter to HR models. For example, the Japanese model of lifelong employment isthe opposite. The new generation Singaporean model of personnel management is very youngbecause it could be. The experience of Russia in this world is enormous. However, the level ofimplementation of his projects is high, mainly due to the recruitment of personnel from foreigncountries.

The requirements for using a renewable power plant are different from those for a traditionalpower plant, and this requires new approaches. This requires the development and involvement ofstaff. This will increase the potential of Japan's skilled personnel globally. In it, the implementationof the teacher-student tradition plays an important role in the desire of employees for the future,withoutlosingtheexperienceoftheirteachers.

Thedevelopmentofenergycompanieswillleadtotheemergenceofnewmanagerswhowillbe able to manage the radical changes that should happen in the near future. When training themost experienced managers, constant competition goes to universities. This applies to countriessuch as the United States, Germany, Japan, India, Singapore, Norway, China, France and the UnitedKingdom. These personnel projects, which are formed in the learning process, are determined notby the internal order and strategic secrets of educational institutions, but by the potential of teachersandstudents.Mostteachersindevelopededucationalinstitutionsareinterns.Theyattractemplo yees with high results in practice. In practice, the essence of this change in energy companiesand new prospects or services may require the creation of a new innovative culture, as well as theneedsoflocalconsumersandthedevelopmentofastrategyfordevelopingcooperationwithregionalb odies.

Using these literature selection criteria, twelve articles were identified for review in furtherdetail,includingsixstudiesfocusingonbuildingfoundations,fiveontheconstructionphase(and/ orconstruction-
orientedproduct),andoneonthebuilding'stotallifecycle(Table1).Theassessmentofthesetwelvearticl es,withvaryingsystemboundaries,isintendedtoprovideanoverarchingpictureof the most recent application of LCA to the construction of building substructures. The aim was topresent results useful for communication about sustainable building construction and geotechnicalworks between stakeholders (e.g. LCA practitioners, geotechnical engineers, foundation designersand contractors),andto facilitatethe broader applicationofLCAresults atdifferentlevels ofplanninganddecision-making.

This process will not be easy for an industry that has long focused on safety and reliability.However, if energy is associated with change, taking a place in your areas of priority need if youwanttosolveit.

In conclusion, it should be noted that the effectiveness of many projects to introduce energysupply today is determined by human resources, the level of their innovation and the correctness oftheir application. At the same time, the most long-term and successful strategy is the fact that thecountry plans to implement and aims to meet the needs of its population without any financialconstraintstomeettheirneedsinthefuture.

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THE IMPACT OF CONTINUITY AND CONTINUITY BETWEEN DISCIPLINES IN EDUCATION ON THE QUALITY AND EFFECTIVENESS OF EDUCATION

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ABSTRACT

The issue of continuity and continuity in education plays an important role in the formation of the child's personality, prepares students for social life and work, as well as provides a thorough acquisition of knowledge, skills and competencies necessary for further education.

KEYWORDS: *Continuity, Continuity, Relevance, Educational Standards, Competitive Personnel.*

INTRODUCTION

The experience of the development of world education shows that the development of society is closely linked with the improvement and development of education.

Continuing education is the basis for the training of qualified, competitive personnel, which includes all types of education, state educational standards, the structure of the training system and its operating environment.

It is known that the State Education Standards stipulate that the principle of continuity and continuity of the system of continuing education is mainly related to each independent type of education and other types and stages of education. At this point, each type and stage of education has its own characteristics, and it is clear that the transition from the previous to the next requires special training from the teacher and the student to be effective. Such problems exist mainly in addressing the issue of continuity, continuity and interdependence between disciplines in the organization of the content and process of education between secondary general education and secondary special, vocational and higher education institutions.

The issue of continuity and continuity in education plays an important role in the formation of the child's personality, prepares students for social life and work, as well as provides a thorough

mastery of knowledge, skills and abilities necessary to continue learning in the next stage of education. At the same time, the study of disciplines in a coherent, coherent manner opens up a wide range of opportunities for students to master their knowledge at all stages of education, from primary education to the continuous development of thinking, memory and creative imagination and the realization of individual abilities.

The establishment of interdependence, interdependence, and consistency between types of education is based on ensuring continuity between disciplines (subjects), chapters, topics, teaching materials. Therefore, to ensure continuity between topics that cover the basics of all disciplines in education, to select teaching materials in accordance with the characteristics of individual age groups of students, to place them on the basis of a certain logical sequence, interdisciplinary interdisciplinary coherence and coherence; creates a problem of substantiation.

Integration in education manifests itself in two forms. First, consistency and continuity between types of education (joints). At the same time, the content of the next type of education partially duplicates the previous one, and in terms of content, it is improved in its subsequent types of education, and the connection continues. Second, consistency and coherence between academic disciplines and topics. This is usually done through interdisciplinary or interdisciplinary links.

Teachers have the following views on ensuring continuity in education:

• In order to ensure full integration in the general secondary education system, it is necessary to work on the basis of the following principles:

• Subject curricula in general education meet the requirements of the STS; compliance with the social order;

• Reflection of theoretical knowledge of the national idea, national ideology; ensure the integrity of students' learning activities;

• Vertical and horizontal continuity in the program; the topics included in the content of the program are selected to form the worldview of students, their interest in learning;

• Correspondence of the existing loads in the program to the psycho-physiological characteristics of students;

•Guidelines for the integration of teaching in the implementation of interdisciplinary communication are reflected in the program;

• The program takes into account the instructions for the use of information technology;

• Placement of program materials on the principle of simple to complex; as well as the grouping of program materials based on thematic, problem-themed, historical principles, and so on.

Integration means the placement of educational material in a certain sequence, systematization, reliance on existing knowledge in the acquisition of knowledge, the application of educational material in certain stages, the duration of the stages of the educational process. This event promotes the effective selection of activities for the placement of materials of the subject and the basics of the subject (science). It should be noted that the following factors play a role in this process:

• The logic of the content of a particular subject (aspects that determine the existence of membership in the subject);

• Concepts, laws and arguments that make up the content of the subject;

• Actions that ensure the gradual disclosure of the essence of the knowledge of a particular field, first and then mastered in an organic way, on the basis of a certain sequence;

• The laws of the process of acquiring knowledge (actions, actions that do not allow the didactic processing of knowledge of a particular field directly into the subject).

Integrity is about ensuring that the types of education, interdisciplinary and interdisciplinary interrelationships and relationships are properly taught. The concept of continuity characterizes the requirements for students' knowledge, skills and competencies in each type of continuing education system.

Using interdisciplinary links in the classroom helps to systematize and deepen students' knowledge, to develop their independent learning skills and competencies, as well as to transfer the knowledge acquired at a lower level of teaching to higher levels.

Seminars and practical classes, in particular, are a method of teaching that ensures the exemplary interaction of the native language and literature and other disciplines in the context of secondary schools. It allows you to optimize the learning process, to realize the interdependence of disciplines in the native language and other areas of literature.

In general, if we gradually deepen the knowledge of the native language and literature, following the didactic principles as much as possible in the formation of skills and competencies in the native language and literature, then we will further strengthen the interest of students in learning it. In this way, students fully enjoy the results of their independent work, and they gain strength and pleasure in solving problems and examples. As a result, their desire to solve complex-looking tasks is growing. At the same time, by applying the function of interdisciplinary interaction to the solution of problems and examples on the basis of the internal laws of the native language and literature, we achieve the full implementation of the formation of skills and abilities of students on a conditional basis.

In our opinion, the basic knowledge in the process of teaching the native language and literature is the knowledge that is formed by the mutual integration of simple concepts, laws, rules, facts; providing for the knowledge of the native language and the science of literature, the exchange of forms that give rise to certain rules, actions and relations on its concepts; and so on. At the same time, as a result of analysis, synthesis, abstraction and comparison, more complex concepts can be interconnected on the basis of a new broad conceptual conclusion and divided into developmental and evaluative knowledge to obtain results in deeper areas of mother tongue and literature.

Therefore, the content of interdisciplinary relations is not limited to the issues of harmonious study of concepts, laws and theories that are common to related disciplines. Interdisciplinary relations are encouraged to reflect new scientific ideas and methods in educational cognition, as well as the broad social connections that have emerged as a result of its integration. However, due to the educational and acquisition nature of interdisciplinary relations, it cannot be exactly the same as the broad relations between disciplines.

The main pedagogical purpose of interdisciplinary relations is the formation of scientific and practical worldview in students through the integrated reflection of the social experience of scientific knowledge of the universe in the educational process.

The pedagogical significance of interdisciplinary communication in the teaching process is that it integrates all the elements of the educational process: content, form, methods and tools, and contributes to its effectiveness. Integral connection is a one-way connection from one component of the learning process to another. For example, the integral connection of theoretical material on a particular subject with the content of laboratory and practical work, or the relationship between the individual stages of training.The universal form of relations is called organic interdependence when the interaction between the components under study is two-way. An example of this is the interaction between educators and students. In some cases, in the interaction, the focus is shifted to the interconnected objects. The word interdisciplinary includes the concept of interdisciplinary interactions. The word interdisciplinary relations means that as a result of interactions between subjects or between their components, a developmental process takes place, that is, something emerges. Hence, the process of connection between objects takes place in order to master the new.

There is a correlation between the content of the subjects or the events, but the membership is not realized unless special pedagogical activity is carried out. Membership is the connection made between the components of the learning process.

Another important aspect of interdisciplinary communication is that in the process of teaching a subject, the teacher has to refer to a lot of literature before conveying it to the student. Especially today, when there is an abundance of information, it is necessary to use the Internet effectively and keep abreast of new information and news coming into our lives. This, of course, places a great deal of responsibility and tireless work on the teacher.

In short, the importance of interdisciplinary links in the teaching of all disciplines is an important factor in improving the general outlook and professional skills of the trained personnel.

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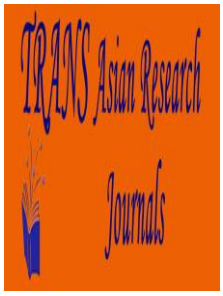

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RECOGNITION IN INTERNATIONAL DOCUMENTS OF THE RIGHT TO SOCIAL SECURITY AS ONE OF THE MOST IMPORTANT HUMAN RIGHTS

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ABSTRACT

This article outlines the basic values of the right to social security, social, economic, and cultural human rights recognized in a number of universal international documents of the United Nations and the International Labor Organization.The issues of implementation of international documents in the field of social protection into the national legislation of the Republic of Uzbekistan as a State recognizing the supremacy of universally recognized rules of international law were also touched upon.

KEYWORDS: *Recognizing, International, Implementation, Ensuring, Community.*

INTRODUCTION

The right to social security is also recognized in the institutions of international law as one of the most important human rights. To date, international standards have been developed and put into practice, reflecting the criteria of law and ensuring their implementation. Such standards cover all spheres of society, including the social security system.

As long as human rights recognized by the international community are implemented in this system, international pension standards are a reflection of international criteria (size, standards) in the field of human rights.

Practical experience has been accumulated in regulating public relations related to the realization of the right to social security, both on the basis of national legal systems and on an international

(interstate) scale, international legal norms and standards have been formed, organizational systems for regulating these relations have been created.

Among the acts that are the most important among the international norms relating to social security are the universal acts of the United Nations, first of all “The Universal Declaration of Human Rights" of December 10, 1948, "The International Covenant on Economic, Social and Cultural Rights" of December 19, 1966, "The International Covenant on Political and Civil Rights" and its Optional Protocols, Conventions on the Rights of Women, Children, and Persons with Disabilities.

Two universally recognized international legal acts on human rights - the Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights, adopted and published by the UN, define the most important criteria, procedures and rights related to pension provision.

The United Nations International Covenant on Economic, Social and Cultural Rights is one of the most authoritative international documents ratified by most countries of the world.

In recent years, after its ratification, the Republic of Uzbekistan has also been implementing legal reforms in the field of pension legislation within its framework.

This document enshrines social, cultural, and economic human rights, which are very important to him. The preamble to the Covenant specifies the following criteria for human rights in relation to his life: "In accordance with the Universal Declaration of Human Rights, it is recognized that the ideal of a free human person, free from fear and want, is realized only when conditions are created under which everyone can enjoy their civil and political rights, as well as their economic, social and cultural rights.”

The present Covenant provides extensive coverage of economic, social and cultural human rights, it also defines in detail the rights to social security, which differ from the "Universal Declaration of Human Rights" (articles 6-15).

In the Covenant, as in other citizens' rights, the rights to social security were described directly, and the details were set out quite clearly and clearly. For example, article 9 of the Covenant states that "the States parties to this Covenant recognize the right of everyone to social security, including social insurance". It is also stipulated that States parties to the Covenant must have an adequate standard of living, including adequate food, clothing and housing for themselves and their families, as well as the steady improvement of living conditions, take the necessary measures to ensure the realization of these rights.

In the "Universal Declaration of Human Rights", human values are highly valued, from an international legal point of view, the inviolability of his body, personality and rights is recognized. This is a human rightand it is emphasized that ensuring freedoms is the main task facing every State.

The basic human rights related to obtaining social security, as well as the content and essence of these rights, issues of their implementation, guarantees and protection are set out in detail in the convention and recommendations of the International Labour Organization. Also, multilateral agreements of regional international organizations provide for international norms and requirements concerning the social protection of various categories of persons (disabled people, children, the elderly, people with certain diseases, single mothers, etc.).

All the Conventions of the International Labour Organization provide, to one degree or another, norms concerning pension provision, since the main task of this organization is to protect the material rights and interests of employees and their family members.

The Republic of Uzbekistan, as a State committed to human rights and ideas of State sovereignty and recognizing the supremacy of universally recognized rules of international law, can recognize that in its Constitution and laws, the Universal Declaration of Human Rights, the International Covenant on Economic, Social and Cultural Rights, the International Covenant on Civil and Political Rights, all norms and rules concerning equality of women and men, directed against racism and any forms and manifestations of social inequality.

In our country, special national organizations dedicated to the protection of human rights have been created, all organizational and legal measures have been taken for the full implementation of all international UN human rights instruments.

In addition, international universal documents on social security law are being implemented into national legislation in a timely manner. For example, article 39 of the Constitution of the Republic of Uzbekistan establishes that "everyone has the right to social security in old age, in case of disability, as well as in case of loss of a breadwinner and in other cases provided for by law."

This article in form and content fully complies with the "Universal Declaration of Human Rights", which establishes that everyone has the right to a standard of living necessary to ensure the health and well-being of him and his family, including clothing, food, medical care and necessary social services, as well as in other cases of unemployment, illness, disability, widowhood, old age or lack of livelihood due to circumstances beyond his control.

Also, the following international documents on social security rights prescribe procedures, criteria and recommendations.

Definition of the circle of subjects entitled to receive social security, types of social security, minimum wage and other important provisions "on minimum standards of social security", adopted in 1952. The 102nd UN Convention on Human Rights.

And international requirements related to the preservation of the right to receive pensions or benefits during certain periods (for example, time spent abroad, time spent in hospitals, etc.), on the basis of which pension provision is issued, are enshrined in the 48th ILO Convention of June 4, 1935 "On the Establishment of systems of International Cooperation arising from Disability, Old Age and loss of breadwinner".

The sixty-sixth session of the ILO on June 4, 1980 adopted Recommendation No. 162 "on older workers", which contained recommendations concerning social security for workers of pre-retirement age and those who have reached retirement age, protection of their material and other rights.

Guarantees for the protection of the rights of foreign citizens and stateless persons to receive social security on the territory of another country are provided for by the ILO Convention No. 118 of June 6, 1962 "on equal rights of citizens of the country and foreign citizens and stateless persons in the field of social security".

Although some documents of international organizations have not been ratified in Uzbekistan, the legislation has been adapted to international standards. Today, one of the urgent tasks facing

us is the ratification of a number of conventions of the International Labour Organization concerning social security of the population, and further reform of legislation based on them. For example, in order to improve national legislation on pension provision and bring it into line with international standards, we consider it appropriate to ratify the International Labour Organization Convention No. 102 “on Minimum Standards of Social Security”.

In the formation and development of the legislative system of social security, along with the conventions of the International Labor Organization, its recommendations in this area served as an important basis. As an example, we can cite the recommendations of the International Labor Organization of 1927 “On insurance against diseases”“ "On insurance against disability, old age, loss of breadwinner”“ "on the introduction of an international system ensuring respect for rights in the field of social security" and a number of others.

"The European Social Security Code is one of the main acts defining European standards in the field of social security, and was adopted by the Council of Europe in 1964.”

The document provides for social security, the types of which are provided to citizens, categories of persons entitled to receive them, criteria for providing social security and other essential circumstances.

As subjects entitled to social security, the document provides for the sick, single mothers, minor children, families with children, the elderly, the disabled, temporarily deprived of work and labor income (unemployed citizens), refugees, migrant workers and members of their families.

The ideas and solutions provided for by this Code, legal mechanisms, methods of pension provision, further improvement of national legislation on pension provision may contribute to a new approach to work in the field of pension provision. Therefore, although this international document has not yet been ratified by the Republic of Uzbekistan, its careful study is useful from a scientific and practical point of view.

The Charter of Paris for a New Europe (signed by the Republic of Uzbekistan on November 27, 1993) is notable for its focus on ensuring and effective protection of human rights in the world, social security of citizens and providing them with the necessary assistance.

In short, the above-mentioned international legal norms are reflected in the legislation on social protection of citizens in our republic.

In conclusion, it should be noted that a legislative system aimed at protecting human rights has been created in our country, legal mechanisms for protecting political, socio-economic rights of citizens have been created that meet international democratic standards, legal reforms are continuing aimed at further strengthening guarantees of freedom and rights in society, which is proof that human interests in our country are the highest value.

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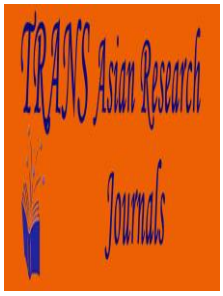

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LARGE SETTLEMENTS IN THE NORTH AND NORTHEAST OF CENTRAL SUGHD IN THE EARLY MIDDLE AGES

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ABSTRACT

The early middle Ages will need to be studied in different parts according to their natural-geographical location. In our opinion, although this region is relatively, "the rustoks in the northern and northeastern part of Central Sogdia", "the rustoks in the northwestern part of Central Sogdia" and "the rustoks in the southern and central parts of Central Sogd" it is expedient to divide the rustaks in the south-western part into three parts, and the most densely populated parts of the Sogdian oasis in ancient and medieval times, suitable for sedentary farming - Central Sogdian political units (rustoq, urban, rural) were in their time the most developed settlements in Central Asia.

KEYWORDS: *Central Sogd Kabudon, Fay, Ishtikhan, Kushaniya Afrosiyob, Dobusqala, Kofirqala, Gabudan - Sivangin (Samarkand) Bulungur, Pay And Karasuv Maymurg Property Kang Talli-Barzu Rabinjon (Kattakurgon), Mingtepa, Bulungur, Pay And Karasuv.*

INTRODUCTION

In order to have a more complete understanding of the historical geography of Central Sughd, it is necessary to study its territory in different parts according to its natural-geographical location. In our opinion, it is expedient to divide this region into three types: “Rustaks in the northern and north-eastern part of Central Sughd”, “Rustaks in the north-western part of Central Sughd” and “Rustaks in the southern and south-western part of Central Sughd”. This is because Central Sughd consists of dozens of cities and rustaks, mainly along the north-eastern, north-western and south-western directions, some of which belong to the Samarkand government, some to the north and northeast and northwest to Kabudon, Fay, Ishtikhan, Kushaniya dominions, and in the south-east it belonged to the dominions of Panjikent and Maymurg [1]. In place of the central city-capitals of these political associations, the remains of cities such as Afrosiyab, Dobusqal'a,

Kofirqala, and Panjikent have been preserved [2] and they are rich in archeological findings which can provide a lot of information for studying the history of Central Sughd.

In Chinese chronicles, Kabudon is mentioned as a separate kingdom north of Kan (Samarkand), and it is noted that it was the southern neighbor of East Tsao-Ustrushona. It is noteworthy that the name of the Kabudon dynasty is mentioned in two different ways in Chinese chronicles at different times. The Bey-shi chronicle states that "Gabudan is located in the northwest of Sivangin (Samarkand) and its ruler lives in Gabudani." The Chinese monk Xuanzang (629-645), who passed through Central Sughd, mentions it in the form of Kienputana. So, in the first quarter of the VII century, this land was a separate kingdom.

This political-administrative unit, which appears in Arabic sources in the form of Kabudon, Kabudonjakas, is shown 2 farsakhs (16 miles) north of Samarkand. Kabudon was a small monarchy located near Samarkand, leading from Samarkand to Ustrushona in the northern direction, sometimes was a subordinate to Samarkand, and sometimes a relatively independent political association [4]. Researchers equate Kabudonjakas in Arabic sources with today's Gubdin[1] [5]. It should be noted at this point that the equating of Kabudon with Gubdin or Kabud was firstly put toward by V.V. Tomashek[2] [6]. But V.V.Bartold, who looked a little different from him, wrote that the village of Kabud was on the site of the present-day village of Besh-ariq [7].

Vidor

The next city after Kabudanjakat was called Vidor or Vidar. The term is also used in some sources as Vizar. In medieval sources, Vidor comes as a city, or rather rustak, located 4 fars (28-30 km) northeast of Samarkand. Its territory is said to have vast, irrigated fertile lands and mountainous areas. It is assumed that large crop areas of Vidor were irrigated through Bulungur, Pay and Karasuv canals. This city was probably located near the mountains called Gobdin and Qaraqchitog today.

It can be seen that the village of Vidor included the areas on the right tributary of the Zarafshan River, north of the present-day Akdarya. According to A. Raimkulov, Vidor included the present-day Payarik district and the western part of Gallaorol district, as well as the territory of Koshrabad district. According to the researcher, the central city of this rustak - Vidor or Vizar is now the largest city in the mentioned area and was in the place of the present Chelak. If the distance between the cities is taken as an average of 4 farsahs, it turns out that the city of Chelak is located 4 farsahs northwest of Kabudanjakat (Mingtepa) [9]. This is confirmed by archeological data. The hill, which covers an area of about 40 hectares in the Chelak area, may be the remains of the ancient city of Vidor. According to researchers, this archeological monument, which is believed to be the ruins of a certain city, is located north of the city of Samarkand, and its location corresponds to the data of written sources. In addition, no monument of this nature is found at this distance except at Chelak [10].

In short, the city of Vidor was one of the largest cities of the Marzban ibn Turkash's rustak, and its location was mainly in the present-day Bulungur district.

Maymurg

In the early Middle Ages, this dominion-estate had its own ruler and army, political boundaries, and included the oasis, which stretched from Panjikent in the east, the Zarafshan River in the

north, Kesh in the southeast, and Samarkand Raboti (Wall of Resurrection) in the west. Maymurg's rule later included the present-day Panjikent, Urgut, Taylak and Samarkand districts.

It is known that in ancient times the estate of Maymurg was formed in the southeastern part of Samarkand Sughd in the I century AD, based on the confederate administration of the Qang state. During this period, the area around the central city of Maymurg (Kuldortepa) was surrounded by strong defensive walls, urbanization processes developed in the oasis, and an urban culture was formed.

In the second half of the 6th century, when Sughd became a major political and economic center under the influence of the Turkish Khanate, along with the Central Sughd rulers, the political, economic and social life of Maymurg flourished and merchants of the oasis began to move along the Great Silk Road. In Maymurg, the urban culture was well-developed (at Kuldortepa, Kofirqala), its area was expanded, defense capabilities were strengthened, and palaces were erected. In the architecture of residential construction, the rooms were built by master builders taking into account the fact that they perform different functions. Prefabricated projects were used in their construction. Archaeological materials confirm the structure of cities, the uniqueness of bullae, pottery, and the widespread use of wood carving, crafts, art and culture was developed. This indicates that in the early middle Ages the influence of wealthy merchants, aristocratic peasants and artisans in socio-political life increased.

In addition to accommodation, administration, and utility rooms, separate rooms were provided for Zoroastrian religious activities (Kofirqala, Room 26). In addition, separate Zoroastrian (Jartepa) and Christian (Koshtepa) temples were built outside the cities. Prior to the Arab conquest, the population practiced Zoroastrianism as well as Christianity. That is, the principle of religious tolerance was followed during this period. The religious temple dedicated to the Zarafshan River in the oasis is considered to be the patron saint of Jartepa and the goddess of water, the goddess Nana Maymurg, who is the protector of the whole being that provides fertility. The estate of Maymurg was also a kind of shopping center in the early middle Ages. In the early middle Ages, oasis merchants actively moved along the Great Silk Road, reaching as far as China. It is mentioned in the written sources that they supplied various material goods to China.

The march of the Arab armies to Sughd also had an impact on the political and economic life of the Maymurg estate. In particular, in 712 the palace of the first period of construction of Kafirqala was completely burnt down, while the marches of 736 under the leadership of Asad ibn Abdullah caused a decline in the political, social and economic life of the estate and caused it to split into several rustaks. That is, in the first half of the VIII century, the estate of Maymurg became a field of political struggle of the Arabs. There were a number of reasons for this. The first is the availability of strong economic opportunities in ownership. This is because the Arabs obtained most of the wealth, military booty, slaves, and food supplies from Sughd through unilateral agreements. That is why the Arabs tried to keep the whole of Sughd under the influence of the caliphate. The second is the presence of a dam in the estate area that supplies water to Samarkand and its environs. In order to quell the uprisings, the Arab armies repeatedly made military raids on the Varagsar Dam. They tried to subdue the population by destroying the existing dam and leaving Samarkand without water. Third, a branch of the Great Silk Road connecting Samarkand with Kesh passed through Maymurg, which was the closest, most convenient, and safest road to Samarkand along the Takhtikoracha Pass. This also created favorable conditions for the movement of Arab troops. The first archeological excavations in

these areas were carried out in the 30s and 40s of the XX century. The first archeological excavations were carried out by A.Yu. Yakubovskiy [12], G.V. Grigorev and I.A. Sukharev at the Talli-Barzu monument and in the Kofirqala shahristan, in its khumdons and nauses [13]. As a result, G.V. Grigorev divided the Talli-Barzu monument into 6 construction periods, where life lasted from the VI-V centuries BC to the VIII century AD, and the monument was the center of the Rivdad rustak which was mentioned in written sources [14]. Although G.V. Grigorev made some mistakes in dividing the monument into construction periods, he isolated the first medieval complex of Central Sughd, developed its periodic date, and began preliminary research on this basis. Later, A.I. Terenojkin enriched this periodic date with new materials, divided it into 5 stages and periodized the first medieval period with TB IV (V – VI centuries) and TB V (VI – VIII centuries) [15]. As a result of planned and stratigraphic excavations carried out in the 50s of the last century, by B.Ya. Stavisky and M.K. Ormanova on the Kuldortepa arch and the defensive walls of the Shahristan, it was concluded that the memorial arch was formed in the III-IV centuries, and the defensive walls of the Shahristan from antique epoch. Researchers have also acknowledged that Kuldortepa was the capital of the Maymurg estate mentioned in written sources. Later, O.G. Obelchenko made an archeological study at Kofirqal'a [16] and G.V. Shishkina at the hill near Kofirqal'a.

In addition to this dominance of Central Sughd - estate or rustaks, there were also several dozen of other large urban and rural fortresses. Among them Choyanchitepa (Kattakurgan), Ishchantepa, Kuldortepa, Jartepa, Koshtepa (Urgut t.), Arabtepa (Samarkand t., Urta Arabkhana village) are located in the northern, eastern, south-eastern, southern, south-western and western parts of Samarkand. Some of them are large settlements belonging to the ancient and early middle Ages, some of which are localized, and some of which are still unknown in the written sources to which city or large village they belong. For example, a monument called Sogish-tepa by the locals can be equated with a city mentioned in early medieval Arabic and Persian sources as Sogarj. Because, on the one hand, the location of this monument and the information about it in the written sources are consistent, and on the other hand, the mutual harmony of the words Sogarj - Sogish allows them to be compared.

In the pre-Islamic periods mentioned above, the dominions in the northern and southeastern parts of Central Sughd were estate: Ishtikhan, Kabudon, Maymurg, and many of the rustaks within them had their rulers, and it is not entirely clear in what titles they ruled. However, it is known that the rulers of Samarkand, the leading force in Central Sughd, ruled under the title "Ikhshid". Yet on the basis of written sources in Arabic and Persian, some researchers, including O.I. Smirnova made specific comments on exactly what titles the rulers of several of the Central Sughd administrations used. According to the researcher, the rulers of the small administrations in the Sughd oasis were called "peasants", "maliks", the first of which was of Sogdian origin and the second of Turkish origin. However, it should be noted that this assumption has not yet been fully confirmed due to lack of evidence.

However, O.I. Smirnova argues that in the relatively small political and administrative units of the Sughd oasis, Iranian-specific terms meaning "great, big" were used – "buzurg", "mehtar" (Sughd: msyδr) [18]. In our opinion, these terms can include Sogdian titles such as xwβ "xuv", xwt'w "god" (probably "katkhudo"), which means a ruler or rustok ruler.

Information on the geographical location of these political and administrative units, located mainly in the northern part of Central Sughd, is reflected not only in the works of Arab and Persian geographers, but also in Chinese sources. At the same time, some information about

them can be found in medieval historical works. For example, in Abu Ja'far al-Tabari's "Tarikh ar-rusul wa-l-muluk" (History of the Prophets and Rulers) (IXcentury), there is information about the population of Buzmajon, Ishtikhan, Fay, Sibiskat (Isbiskat), Yorkat, who fled to Fergana together in the early 720s due to the Arab invasion. It is obvious that political relations were established between the inhabitants of these neighboring rustaks, in which their population spoke a single ethnocultural basis - the Sogdian language and Zoroastrianism.

Archaeological excavations in the northern districts of Samarkand region in recent years have uncovered many early medieval Sogdian coins, some of which bear the image of a ruler and a stamp, and some of which mimic Chinese coins. These coins contain a distinctive title, symbol - a seal and a toponym, on the basis of which it can be assumed that the Central Sogdian rulers, such as Ishtikhon, Fay, Kabudon, Maymurg, had their own coins. Some of the coins have the image of a ruler typical of the ancient Turks, Turkish titles such as "Haqqan", "Khotun" and tribal seals. At the same time, the inscriptions on some coins have not yet been read in full, and it is possible to think more clearly about this issue if they determine exactly which authority is the name of the estate, a certain title. Only so far it can be said that most of the coins are found in the northern and northwestern regions of Samarkand region, Rabinjon (Kattakurgan), Mingtepa, as well as in the remains of a number of cities in the east of the region, indicating that their minting is associated with these areas.

Thus, in the ancient and medieval times, the most densely populated, sedentary parts of the Sughd oasis - the political and administrative units of Central Sughd (rustok, city, village) were once the most developed settlements in Central Asia. This feature of these administrative units, which are mentioned in written sources as settlements inhabited by artisans and traders, is more vividly confirmed by archeological research conducted for almost a hundred years.

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A REVIEW ON TRANSGENIC ANIMALS

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ABSTRACT

An animal that has successfully integrated modified DNA into its germ line is known as a transgenic animal. The transgene may be passed on to every progeny of such an organism. It is important to note that a transgenic individual's transgene is present in all of his or her cells. The capacity to insert foreign genes into the germ line and successfully express the inserted gene in the organism has enabled unparalleled genetic manipulation of animals. The knowledge acquired through transgenic technology may be used to virtually every area of contemporary biology, including developmental gene control, oncogene activity, the immune system, and mammalian development. Because particular mutations can be inserted into transgenic mice, precise mouse models for human genetic disorders may be created, as well as a systematic genetic dissection of the mammalian genome can begin.

KEYWORDS: *DNA, Germ Line, Genetic, Transgenic Animals.*

1. INTRODUCTION

One of the most significant recent technical breakthroughs in biology is the insertion of genes into the germ line of animals. Transgenic mice have helped researchers learn more about the processes of development and developmental gene control, oncogene activity, and the complex cell interactions that occur inside the immune system. Furthermore, transgenic technology opens up intriguing prospects for creating accurate animal models for human genetic disorders and huge amounts of commercially essential proteins using genetically modified farm animals. Microinjection of simian virus 40 (SV40) DNA into the blastocyst cavity produced the first animals with experimentally introduced foreign genes. DNA reassociation kinetics showed that the injected DNA was present in a variety of somatic tissues generated from animals that had been injected as embryos. In these early studies, however, incorporation of viral DNA into the germ line was not shown. According to a subsequent research, some SV40 DNA remained episomal in somatic tissues. When mouse embryos were exposed to infectious Moloneyleukemia

retrovirus (M-MuLV), which led in the creation of the first transgenic mouse strain, germ line transfer of foreign DNA was found in later investigations[1], [2].

One technique of genetically modifying mouse embryos involves infecting them with retroviruses. Direct microinjection of recombinant DNA into a pronucleus of a fertilized egg is a more frequently utilized method for producing transgenic animals. Finally, a newly discovered method includes injecting DNA into embryonic stem cells (ES cells) through viral transduction or transfection, which may contribute to the germ line when injected into host blastocysts.

1.1.Incorporation Of Genes In Animals:

1.1.1. DNA Is Injected Into The Pronucleus Microscopically.

The most commonly and effectively utilized technique for producing transgenic mice is microinjection of cloned DNA directly into the proudest of a fertilized mouse egg. Multiple DNA molecules organized in a head-to-tail array often integrate into the host genome in a stable manner. Before integration, the injected DNA molecules are believed to interact through homologous recombination and, in most instances, insert into a single chromosomal location. Random chromosomal breaks, perhaps produced by repair enzymes triggered by the free ends of the injected DNA molecules, may serve as tentatively conclude for the alien DNA, according to one theory. At the insertion sites, rearrangements, deletions, duplications, and translocations of the host sequences are common. The injected DNA, on the other hand, does not always integrate into the host genome. Depending on the structure of the injected DNA, the bovine papillomavirus (BPV) either integrates stably into the genome of transgenic mice or is retained as an episome[3].

The efficiency of producing transgenic lines that express most genes in a predictable way is the main benefit of direct microinjection of recombinant DNA into the pronucleus. However, this technique has the drawback of not being able to transfer genes into cells during later stages of development. Furthermore, due of the numerous copy inserts and host sequence rearrangements, cloning the chromosomal insertion site may be challenging. Infractions are returned. Retroviruses, unlike microinjected DNA, integrate into the genome of the infected cell via a well-defined process. Only one proviral copy is inserted at a particular chromosomal location, and no host genome rearrangements are produced other than a brief duplication of host sequences at the integration site.

The primary benefit of using bacteriophages or retroviral vectors for gene delivery into animals is the technological simplicity with which virus may be introduced into embryos at different stages of development. Furthermore, isolating the flanking host genes of a proviral insert has shown to be considerably simpler than isolating the flanking host sequences of a DNA insert generated from pronuclear injection. When trying to identify the host genes disrupted by proviral DNA insertion, this is a significant benefit. The size restriction for transduced DNA and unsolved difficulties of reproducibly expressing the transduced gene in the animal are the major drawbacks of using retroviruses for gene transfer[4].

1.2.Genes In Agrobacterium TumefaciensAnimals:

1.2.1. Cloned Genes Are Injected Pronuclearly.

The critical challenge has been the injection genes' predictable and tissue-specific expression. Only modest or highly variable expression, depending on the chromosomal location of the inserted gene, was observed in early studies. It was quickly discovered that the presence of prokaryotic vector sequences inhibits the proper expression of specific genes such as 3-globin, a-actin, and a-fetoprotein. As a result, most researchers now delete the prokaryotic vector sequences before injecting the gene into embryos to prevent any potential gene expression disruption caused by these sequences. Genes encoding immunoglobulin (Ig), elastase, and collagen, on the other hand, seem to be less susceptible to the presence of vector sequences and are often expressed regardless of chromosomal location[5].

Much work has gone into figuring out what causes genes to be activated throughout development. Transgenic mice have aided in the discovery of cis-acting sequence regions that regulate tissue-specific gene expression. The 5' flanking sequences, either proximal or distal to the promoter, inside the gene itself, and the flanking sequences have all been shown to include such components. By routinely introducing DNA constructs into embryos with various lengths of flanking sequences, tissue-specific enhancer elements for certain promoters have been discovered[6].

The use of transgenic mice in the study of developmental activity of the 3-globin gene family has proven especially beneficial. In erythroid cells, different "embryonic," "fetal," or "adult" globin genes are expressed sequentially throughout development. Cloned embryogenesis globin genes were expressed properly in the mouse germ line and stage-specific activation was reliant on enhancer regions at both the 3' as well as 5' ends of the gene. Despite this, significant issues with 3-globin expression persisted. The transgenes were never expressed at a level equivalent to the expression of the native gene, and their expression was always dependent on the location of chromosomal insertion or irrespective of the copy number. The injected gene was expressed at a level similar to the endogenous globin gene as well as directly linked to the copy number when sequences 20 to 50 kb from each side of the 1-globin gene were inserted.

The combination of a tissue-specific enhancer and a specific promoter often determines the tissue in which a gene is expressed. The Ig enhancer, for example, directs Ig or myc expression to B cells but boosts SV40 T antigen production in numerous organs. In a recent research, pairs of genes with or without introns (as complementary DNA) were microinjected into embryos, demonstrating that sequences located in introns may be important in regulating the amount of transcription in animals but not in cultured cells[7].

Microinjected genes have also been found in rabbit, sheep, as well as pig embryos. However, the success rate of producing transgenic domestic farm animals is considerably lower than that of mice, owing to technical challenges in seeing the pronucleus in these species' embryos. Despite these challenges, a human growth hormone gene effectively inserted into the pig was unable to enhance development, perhaps because the human hormone was not physiologically active in pigs. Although the value of genetic engineering in livestock improvement has been questioned, transgenic farm animals are expected to become a source of commercially useful proteins. Medically important proteins, for example, those have been targeted to mammary epithelial cells, may be extracted from the milk of transgenic cows, as has been shown with transgenic mice.

1.3.Viruses From The Past:

Preimplantation mouse embryos or embryonal carcinoma (EC) cells were shown to be incapable of supporting retrovirus production and replication in early studies. Virus, on the other hand, is

effectively expressed in later stage embryos or differentiated EC cells. Because the viral LTR, which includes the viral promoter and transcriptional regulatory elements, is not functional in early embryonic cells, virus replication is limited. In nonpermissive embryonal cells, transcriptional inactivity has been linked to de novo methylation of the provirus, nonfunctioning of the viral enhancer or downstream regions, repressor activity, and a lack of activating stimuli.

1.4.Transgenic Technology's Applications:

Oncogenesis and illness models; the possibility of employing particular promoters or enhancers to guide heterologous gene expression to a specific cell has sparked many efforts to manipulate an animal's physiology in the lab. The use of transgenic technology has been very beneficial in investigating the effects of oncogene expression in animals. Problems that cannot be addressed satisfactorily in cell culture can be addressed using transgenic mice, such as the spectrum of tissues susceptible to an oncogene's transforming activity, the relationship between multistep oncogenesis and oncogene cooperativity, and the effect of oncogenes on growth and differentiation[8].

1.5.Marker of ancestry:

The development of destiny maps to evaluate cell ancestry, cell location, and cell commitment in the developing embryo is a key problem in modern biology. Because the preimplantation embryo is readily manipulability, researchers have employed visual observation and implanted lineage tracers to investigate the early phases of mammalian development (76). The embryo's inaccessibility once implanted in the uterus, on the other hand, makes studying cell lineage at later stages difficult and prevents the use of direct lineage tracers. As a result, the creation of permanent markers of individual progenitor cells that do not disrupt the embryo was required for the investigation of cell lineage in the post-implantation embryo[9].

1.6.Markers That Identify Chromosomal Regions:

Foreign DNA sequences inserted into the adjacent host locus may serve as useful molecular markers for which no probes would otherwise be accessible. A proviral genome inserted into the pseudo autosomal region of the mouse sex chromosomes, for example, proven to be a unique molecular marker for the study of this extremely repetitive sequence-rich area (80). In the pairing area of the sex chromosomes, genetic research showed a significant incidence of uneven crossing-over as well as double cross-over events. Transgenes carried on the X chromosome have been discovered to either evade X-chromosome inactivation or to function like an X-linked gene. Cloning and analysis of the host sequences surrounding these inserts may help researchers better understand the molecular processes governing chromosomal pairing and mammalian X inactivation.

1.7.Transgenic mice have mutations:

By altering the function of an endogenous gene, the insertion of foreign DNA sequences into the cellular genome may induce mutational alterations. The majority of recessive insertional mutations in transgenic mice have been caused via retrovirus infection of embryos or ES cells or microinjection of recombinant DNA into the pronucleus.

Many integration sites have been cloned in mutants caused by DNA microinjection. To far, no transcripts of host sequences matching to the altered gene have been identified, in contrast to retrovirus-induced mutations. , duplications, rearrangements, Deletions, or translocations have all

been seen at the integration site, according to junction fragment analyses. Retrovirus integration, on the other hand, results in a brief direct duplication of host sequences at the location of the single proviral insert but no additional host genome rearrangements. The sequence rearrangements observed in insertional mutants generated by DNA microinjection are expected to make determining the underlying molecular defect that caused the mutant phenotype more difficult. This is especially dangerous if the rearrangements occur far from the exogenous DNA's integration location[10].

2. DISCUSSION

Researchers have been able to learn much more about processes of development and developmental gene regulation, oncogene activity, and the intricate cell interactions that occur inside the immune system thanks to transgenic mice. Furthermore, utilizing genetically modified farm animals to provide realistic animal models for human genetic diseases and large quantities of economically important proteins, transgenic technology offers up exciting possibilities. Transgenic technology has implications for almost every aspect of modern biology, including developmental gene regulation, oncogene activity, the immune system, and mammalian development. Specific animal models for human genetic diseases may be developed, and a systematic genetic dissection of the mammalian genome can begin, thanks to the ability to insert specific mutations into transgenic mice. In recent years, the use of transgenic animals has grown significantly. For a variety of reasons, embryo manipulation and gene transfer have advanced to the point that they are now considered standard procedures. Each of the three methods for generating transgenic animals has its own set of advantages and disadvantages for certain applications. Pronuclear injection of recombinant DNA is the method of choice for obtaining expression of a foreign gene in almost any tissue. Retroviruses or retroviral vectors are superior for genetic tagging of chromosomal loci, for example, for insertional mutagenesis, or of cells for lineage study. Finally, the most current method for generating transgenic animals from ES cells allows for the production of mice with any genetic or phenotypic characteristic for which in vitro screening or selection techniques are available.

3. CONCLUSION

In recent years, there has been a dramatic rise in the usage of transgenic animals. The techniques for altering embryos and transferring genes have been improved to the point that they are now considered routine operations for a range of applications. When genetic tagging of chromosomal loci, for examples, for insertional mutagenesis, and also of cells for lineage research, retroviruses or retroviral vectors are better. Finally, the most recently discovered technique for producing transgenic animals from ES cells allows for the creation of mice with any genetic or phenotypic traits for which in vitro screening or selection procedures exist. Rapid advancements are expected to occur in the following areas. Isolation and characterization of chromosomal regulatory regions regulating developmental gene activation across long distances will be critical. Incorporating such components into gene constructs should ensure that expression is predictable and efficient regardless of the chromosomal integration location. This is especially essential for big farm animal genetic engineering, because economic limitations limit the number of transgenic lines that can be produced and assessed. (ii) The numerous options for labeling early embryonic cells or ablating particular lineages allow researchers to get access to phases of mammalian development that have hitherto been difficult to manipulate. This will undoubtedly hasten our knowledge of mammalian development's intricate cell connections. (iii) The ability to generate recessive or dominant mutations in preselected genes will not only allow for the

development of precise animal models for human hereditary diseases, but it will signal the start of a systematic genetic dissection of developmental changes, which will have a profound impact on the future of experimental mammalian genetics.

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USE OF EDUCATIONAL MEDIA AS A FACTOR IN THE INTEGRATION OF FOREIGN LANGUAGE TEACHING METHODS

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ABSTRACT

Foreign language teaching can be done by different teachers in full-time, part-time and mixed forms of education. Distance technologies are used in forms of distance and mixed education. This article is also about the effective use of information technology in foreign language teaching.

KEYWORDS: *Methodological System of Foreign Language, Verbal Communication Skills, Use of Information Technology, Linguistic Discourse, Psychological Skills, Computer Assisted Language Learning.*

INTRODUCTION

A variety of textbooks are used in foreign language teaching, including textbooks based on the use of computer technology. This is a description of the structure of the methodological system of teaching a foreign language, which is often implemented in pedagogical practice.

Involvement of educational media provides new opportunities in language teaching. With the help of these tools, the methodological system of foreign language teaching can be formed in such a way that the development of several types of skills and competencies can be carried out simultaneously using different teaching methods. For example, modeling and learning grammatical structures can be complemented by the development of verbal communication skills, which is ensured by the integration of different methods of teaching foreign languages within a course based on the use of educational media on the Internet.

The widespread use of information technology has allowed free access to educational media, such as e-learning resources for foreign language teaching. Of course, some of them may find practical application in a particular methodological system of education, but special approaches and methods need to be developed to select such e-learning resources that may be most useful in education.

It should be noted that the means of informatization of education allow the implementation of a mixed form of education.

All of the above requires the formation of a sound approach to the use of educational media in the methodological system of foreign language teaching. Such approaches can be built on the basis of the model of this methodical training system.

The theory and practice of teaching foreign languages in our country has a long history. However, the approach to the systematic study of linguistic material was only formed in the mid-20th century. From that time on, teaching foreign languages at local universities became mandatory. Students are focused on the practical mastery of foreign languages: the development of comprehension skills while listening and reading a foreign language, the expression of ideas in a foreign language orally and in writing. At present, the teaching of foreign languages is determined by the standard of higher education, which defines the main goals and content of education. The content of foreign language teaching is grouped around the following components:

- Linguistic discourse, which combines socio-cultural and linguistic and regional elements that students need to master;

- Psychological skills, including the ability of students to use a foreign language for communication purposes;

- Related to the acquisition of methodological, teaching methods, knowledge of innovation, related to the development of their independence.

It should be noted that the methods of teaching foreign languages change over time and are significantly objective (political, scientific, cultural, social, etc.) and subjective (student preferences and teaching). Depending on factors. Existing methods of teaching foreign languages G.V. Rogova has been considered in his scientific work.

1. Structural methods consider language as a system of structurally related elements of grammar: the grammatical-translational method is traditional, aimed at teaching translation and reading, the audio-linguistic method of listening and consists of repetition; the basis of the proprioceptive method by a student of records repeated many times by the teacher is the simultaneous use of cognitive, motor, neurological, auditory functions of the brain;

2 Functional methods, which consider language as a means of expressing or implementing a particular function: situational learning is based on the principles of language structure and behaviorism. The student learns by repeating the most common words and constructions of the language in practice, a focused practice is an approach in which the student repeats phrases before memorizing them mechanically;

3 Interactive methods, considering language as a means of creating and supporting social relations: the direct method involves teaching in the primary language, the sequential method - to A subtype of the ‘direct method’ involves the targeted use of communicative learning. language, both in assignments and for communication with the teacher / in the group, language absorption, silence method, the teacher who uses this method listens more than speaking, the natural approach - the student can not do their job emphasis is placed. Learn everything. Each subsequent part of the learning material should, of course, be based on the past and at the same time be easy to master, the method of physical response is that students first perceive passively

without using the material, and then they It implies that they have a physical relationship to things. Words, for example, to action verbs. And only after going through the first two stages do students begin to practice the language on their own, with reading and storytelling skills being part of the physical response method. It consists of the teacher telling short stories saturated with new words and a series of questions to the students, asking them to give simple but emotional answers, the method of teaching the language of "Dogma" - this method refuses to use textbooks. Instead, more emphasis is placed on teacher-student communication. The materials used by the student must be written by himself;

4 Methods that are the object of copyright: The Pimsler method is based on the mastery of a sequence of audio recordings that include a basic vocabulary and require students to actively repeat the material, the Michelle Thomas method is a series of lessons in the classroom audio recordings, where the teacher works with two students, tells them the basic rules of grammar, teaches vocabulary and gives assignments, Kitaygorodskaya method - a methodology due to the widespread use of group forms of interaction in the learning process and there is a close connection between social relations. Psychology describing this concept of intensive learning;

Thus, a variety of literature suggests different ways of teaching foreign students at universities.

Analysis of the literature shows that the use of information technology in the teaching of foreign languages began in 1926. It was at this time that the Sydney Machine was created. The methodology of this experiment was based on programmed teaching based on the work of American scientists. In 1954. CALL ("Computer Assisted Language Learning") stands for Computer-assisted language learning. The introduction of computers in foreign language teaching in the 1980s was both theoretically grounded and practiced in a number of foreign countries. The pedagogical process of using computers in teaching has developed in parallel in our country. In the 1960s and 1980s, computers were widely introduced in educational institutions, and training courses and computer programs were created. Since the late 1980s. In the USSR, and then in Russia, the problems of the introduction of information technology and computers in the educational process are being actively studied. In the works of V.P. Bespalko, M.A. Bovtenko, E.E. Gorshakova suggests several classifications and stages of the use of educational media in teaching and, in particular, in the teaching of foreign languages.

Nowadays, computer tools for teaching foreign languages can be located on a computer or can be accessed through the Internet telecommunications network.

In the 21st century, there is an opportunity to actively communicate using the Internet. This led to the creation of a new direction - electronic lingvodidactics, which includes language learning in contact and remote modes. It should be noted that all of the above approaches are mainly focused on the static use of data hosted on a computer network. This describes the paradigm of using information technology in education, known as web 1.0 technology. However, due to the widespread introduction and development of the Internet, the use of various Internet services for educational purposes and, in particular, for learning foreign languages is being updated. One of the promising directions is the use of these web 2.0 technologies and services for educational purposes. Web 2.0 technologies and services provide more active and efficient communication, the ability to place almost unlimited information resources on the Internet.

One of the features of the use of educational media in the teaching of foreign languages is the important role of e-learning resources. Such means of informatizing education are common. E-learning resources are teaching aids and should therefore meet a system of general, traditional

didactic requirements, which include: scientific character, availability, problem-solving, accuracy, structure and consistency of teaching, knowledge transfer Strength of integration, unity of education, developmental and educational functions of teaching. At the same time, they should be relevant to the didactic features of foreign language teaching and have an interactive nature, allow hypertext, sound and image to be combined, perform a detailed search for information, and include knowledge verification systems. The effectiveness of the use of educational media in general, and e-learning resources in particular, depends on the proper organization of the educational process, using methods and forms of education that are relevant to the purpose and content. There are enough e-learning resources in foreign languages on the Internet. In this regard, the problem of evaluating and selecting the required e-learning resources arises. Given the large number of factors that determine the quality of training, the lack of formalization of some processes associated with the teaching of foreign languages, the solution of the problem of selecting the necessary e-learning resources for the learning process can be done using expert assessments.

In conclusion, based on the analysis of the components of the methodological system of foreign language teaching, it was found that a certain set of teaching methods is used in a practical course of foreign language teaching. Full-time, part-time, mixed forms of teaching are used in the learning process. The use of educational media provides an organic combination of different methods of teaching a foreign language in one course, which determines the possibility of integration of educational media in teaching foreign languages. Among the many means of informatizing education in foreign language teaching, e-learning resources are of particular importance. Given the fact that the process of teaching foreign languages is not sufficiently formalized, the solution to the problem of choosing e-learning resources can be achieved through expert assessments of the quality of resources. The dissertation proposes a method of examination based on the request of experts, the purpose of which is to determine the appropriateness of the use of e-learning resources in foreign language courses.

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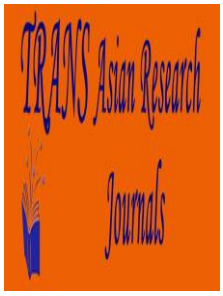

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SOCIO-CULTURAL FACTORS AND TRENDS IN THE DEVELOPMENT OF REPRODUCTIVE HEALTH CULTURE IN MODERN UZBEKISTAN

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ABSTRACT

This article is about the role of reproductive health in society, women's health, its development, making it a daily lifestyle. If we talk about the reproductive health system, then we mean not only diseases in the reproductive system, but also mental state and social well-being. Not only doctors but also psychologists and sociologists are concerned about reproductive health.

KEYWORDS: *Reproductive Health, Demographic Policy, Women's Health, Pregnancy, Childbirth and Postpartum Period, Abortion, Nutrition, Medical Care.*

INTRODUCTION

The population growth process in Uzbekistan is characterized by a sharp increase in mortality and a significant decrease in the birth rate, a decrease in the vitality of the newborn generation. In this regard, it is important to understand the importance of not only the quantitative aspects of birth, but also the qualitative aspects that are most fully expressed in the formation of the term “reproductive health”. Reproductive health is a state of complete physical, mental and social well-being in all matters related to the functions and processes of the reproductive system, as well as psycho-social relationships at all stages of life. It is an essential foundation for overall health and a central part of human development. Creating a conducive environment to achieve an acceptable level of reproductive health in the community will allow women to safely go through the stages of pregnancy and childbirth and give couples the best chance to have a healthy baby. Reproductive health applies to both women and men.

Reproductive health is a new direction in the development of demographic policy. Improving reproductive health is one of the most important national priorities of demographic policy in the concept of demographic development of the country adopted by the Government of the Republic. The success of its implementation is predetermined by the degree of scientific substantiation of ways to solve reproductive health problems.

It is now becoming increasingly clear that the state of women's health is the most important basis for shaping the interdependence of vitality and energy transfer from generation to generation.

However, the state of health of this woman, her level of ability to protect the immune system is becoming increasingly weak, which in certain adverse conditions contributes to a decrease in her reproductive potential, the level of health. And the vitality of the offspring of newborns, in all subsequent stages of the life cycle of their development. Nowadays, the presence of somagic, infectious and gynecological diseases in women, living in a state of constant psychological stress and prolonged chronic stress, a wide range of bad habits that lead to the manifestation of various mental disorders and misalignment to such uncomfortable situations. Prevalence, a sharp decline in the standard: living, inadequate or unbalanced nutrition, difficulties in receiving timely and adequate medical care, and so on.

As a result, the reproductive health of Uzbek women has deteriorated significantly.

One of the most important components of the deterioration of women's reproductive health is the increase in morbidity during pregnancy, childbirth and the postpartum period.

The most important manifestation of malnutrition and micronutrient deficiencies in the majority of Uzbeks is the increased risk of declining health potential due to the high prevalence of anemia in the population.

This may be due, on the one hand, to the worsening of anemia in recent years and the poor course of treatment, on the other hand, to a more negative reaction of the weakened female body to labor stress and even loss during childbirth. This is due to a decrease in the ability of functional compensation to restore the homeostatic parameters of a woman's life in the postpartum period. In addition, there is no denying that the prevalence of anemia among pregnant and postpartum women is related to the deterioration of nutritional quality, the lack of a system of mass targeted prevention of anemia, as well as established traditions.

Many medical-biological, socio-economic, ecological-geographical, sanitary-hygienic factors affecting the mother are manifested in the form of toxic effects on the fetus indirectly - hypoxia and restriction of fetal resource supply. Fetal hypoxia is a common complication of pregnancy and childbirth, leading to serious damage to the central nervous system and other vital organs not only in the postpartum period in newborns, but also in the later life of the child.

In modern conditions, maternal mortality is increasingly considered by experts as one of the leading criteria of socio-economic well-being of society. Indeed, modern advances in medical science are sufficient to prevent a single case of maternal mortality from the "complications of pregnancy, childbirth, and the postpartum period" causal class. However, maternal mortality is still high in developed countries.

The data obtained show real opportunities to further reduce maternal mortality while improving primary prevention of diseases during pregnancy, childbirth and the postpartum period, as well as improving the quality and availability of obstetric and gynecological care.

In modern socio-demographic conditions, the issue of reducing reproductive losses in the process of population growth by increasing the effectiveness of measures aimed at reducing the prevalence of induced abortions is particularly relevant. The prevalence of abortion remains one of the most striking features of the extent to which family planning ideas penetrate the mass reproductive consciousness of women.

Time will force us to focus on strengthening the evidence that it is advisable to implement the most cost-effective measures in reproductive health programs, in particular abortion reduction

measures. Ensuring the cost-effectiveness of the programs will be overshadowed by the success of major advances in reducing the overall number of abortions in the country. A clear example of this is the significant reduction in the use of mini-abortions in a number of regions, and in the country as a whole. This, in fact, leads to an increase in economic damage and an underestimation of economic efficiency due to a decrease in the number of abortions with the lowest risk of subsequent complications.

The rate of induced abortions in Uzbekistan remains one of the highest in the country as a whole, despite some positive trends in declining numbers in recent years.

Maternal ill health is primarily manifested as the health of newborns. The health of each subsequent generation of newborns continues to deteriorate. At the same time, diseases with a high risk of death and disability have increased significantly, which requires the development of highly specialized technologies of treatment and rehabilitation and the creation of a special network of medical and social institutions.

In recent years, the loss of premature infants has decreased, fetal losses have stabilized, which is related to the success of clinical and organizational tactics of treatment and rehabilitation of this contingent of children.

Numerous studies have proven a close correlation between economic factors and mortality rates. However, in recent years, transitional researchers have noted a change in the relationship between death and other factors. For example, the role of timely use of modern health technologies and education of the population is growing significantly.

So we can draw some conclusions. Against the background of a sharp decline in fertility in Uzbekistan, the process of reducing the reproductive capacity of women is developing rapidly, which should ensure the birth of healthy children from generation to generation. This requires attention not only to the quantitative indicators of birth, but also to its qualitative characteristics.

Pathological fertility is becoming a major factor complicating the birth process, reducing the need for children in modern families. Increased pathology of pregnancy, childbirth and the postpartum period, followed by initial and irregular visits to antenatal clinics, then the problems of timely, availability and quality of obstetric and gynecological care, the need to form a woman's personal responsibility for her.

Despite the declining prevalence of abortions, the birth-to-abortion ratio remains disproportionate, with the result that the consequences of abortion affect the state of women’s reproductive function over a long period of time. The parallel growth processes of the use of modern contraceptives reveal the incompatibility of educational activities with syphilis and serve as a basis for their correction and integration. Significant growth of malignant neoplasms of the reproductive sphere raises the problem of their targeted prevention. Indicators and causes of maternal mortality reflect unresolved maternal reproductive health problems. Successful resolution of the couple’s infertility problem is one of the resources for families to have the required number of children. There is a need to develop comprehensive reproductive health programs at the federal, district, regional and city levels.

In conclusion, it is worthwhile to make the following recommendations:

1. In formulating the basic principles of regional family policy, it is necessary to:

- Analysis of the demographic situation in the region, study of the sex, age and social composition of the population of the region, analysis of key indicators of reproductive health;

- Identify the strengths and weaknesses of existing systems and structures, identify priorities based on sociological research and analysis of key indicators of reproductive health.

2. The solution of temporary problems by program-targeted methods implies a proven validity and expediency of spending funds. The implementation of targeted programs is easily monitored and effectiveness is evaluated.

3. In order to increase the birth rate and provide access to medical care for women suffering from infertility, it is necessary to finance medical services for this type of pathology from the regional budget.

4. Creating an integrated model of family reproductive health protection requires consideration of several factors - medical, organizational and economic. In the absence of financial resources, the functional integration of different structures and departments aimed at solving pressing problems is the most desirable.

5. We believe that in order to rationally allocate functions and human resources, it is necessary, first of all, to develop a regional network of social assistance institutions for families and children, which will provide a professional and comprehensive solution to the social problems of the family.

6. In the implementation of interagency cooperation in the system of family protection, it is expedient to be based on the principle of medical and social support of the family, developed by us. Using the model we have created to evaluate the final results of activities on a monthly, quarterly and annual basis, it is possible to control the quality of work of subordinate institutions and the system as a whole. In addition, there is a need for rapid exchange of information between medical and social workers in order to resolve some issues in a timely manner.

In the reproductive health system, medical care should be provided from the planning stage of pregnancy and at each stage of development in the interdisciplinary section: fetus - newborn - girl - girl - woman. The guiding principles of the organization of medical care for women and children are timeliness, step-by-step, availability, proven expediency, family orientation.

7. We propose to expand the responsibilities of the family planning departments of antenatal clinics by giving them the responsibility to work with families with various problems in the reproductive sphere. It is advisable to conduct primary prevention activities with the wide involvement of educational institutions and the media.

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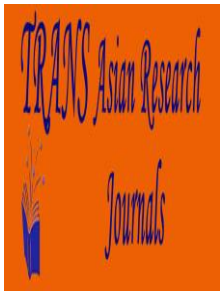

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LINGUOCULTURAL APPROACH TO THE STUDY OF SPANISH PHRASEOLOGICAL UNITS

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ABSTRACT

In this article we will focus on the phraseological units of the Spanish language, which have a pronounced national and cultural specificity. In the study of the national-cultural specifics of the phraseological composition of the language, the main attention is paid to the figurative basis of phraseology, usually represented by metaphors belonging to various cultural codes. The cultural component, reflecting the national-cultural originality of phraseological units, includes elements of material and spiritual culture inherent in a particular ethnic group, pre-scientific knowledge about the world, national symbols, references to precedent phenomena and processes.

KEYWORDS: *Cultural Linguistics; Phraseology; National And Cultural Specificity; Cultural Code, Precedent Phenomena; Evaluating Meaning.*

INTRODUCTION

Language should be considered as a verbal code of culture, as its creator, since material and spiritual culture find their expression in language [7, 15-26]. E. Sepir put 3 meanings into the term "culture":

1. Culture is understood as a kind of product of a person's material or spiritual activity, fixed by traditions and time.

2. Culture implies a certain set of rules of behavior in society, conditioned by its value orientations.

3. Culture is understood as a civilization reflecting both universal knowledge, attitudes, views on life, and purely national specifics [11, 466-470]. It is this definition of culture that is the main one for the linguocultural focus of our research.

The linguocultural approach to the study of phraseological units "is based on the postulate of the interaction of culture and language as two different semiotic systems, as a result of which the

formation of a culturally conditioned phraseological subsystem of natural language is carried out, in which any phraseological unit acquires the status of a sign of the "language of culture" [3, 8].

V.A. Maslova writes, "The nature of the meaning of phraseological units is closely related to cultural connotations, background knowledge of a native speaker, with the practical experience of the individual, with the cultural and historical traditions of the people speaking this language. Phraseological units directly (in the denotation) or indirectly (through the correlation of the associative-figurative basis with the standards, symbols, stereotypes of national culture) carry cultural information about the world, society.Therefore, phraseological units are a kind of "storehouse of wisdom" of the people, preserving and reproducing the mentality of the people and their culture" [2, 278].

Phraseology, according to V.N. Telia, is "the most culturally-bearing composition of the language, serving as a kind of translator of culture" [7, 11]. It was V.N. Telia who developed the basic concepts of linguoculturology, to which she refers the concepts of "culture", "text of culture", "thesaurus of culture", "code of culture", "symbolary of culture", "cultural connotation", "cultural and linguistic competence", etc. [6, 13–24].

As V.N. Telia noted, the main way of embodying the national-cultural specificity of phraseological units is the figurative basis, which may include culturally marked realities, and the main way of indicating this specificity is "interpretation of the figurative basis in the iconic cultural-national "space" of this linguistic community. This kind of interpretation is the content of the cultural and national connotation" [5, 215].

Let's focus on some types of nationally and culturally determined phraseological units of the Spanish language.

Phraseological Units Correlating With Spanish Precedent Texts

The phraseology "*Tantomonta*" ("everything is one, what is one, what is another") is part of the motto of the Catholic Kings Isabella and Ferdinand "*Tantomonta, montatanto*", which meant the unity of the crowns of Castile and Aragon: *Si no tienescoñac, échaleunchorrito de güísqui, que tantomonta*[8, 741-742].

"If you don't have cognac, pour him some whiskey, it doesn't matter". The famous phrase from the IX chapter of the 2nd part of the novel by M. Cervantes "Don Quixote" "*Con la iglesiahemos dado, Sancho*" (We stumbled upon the church, Sancho) in a slightly modified form "*Con la iglesiahemostopado*" is usually used in cases where there is a church ban on a particular type of activity, although in the novel itself this phrase is taken literally, because in search of the Dulcinea palace, Don Quixote and Sancho really stumbled upon a church building . The source of the origin of the speech formula "*Todos auna, comolos de Fuenteovejuna*" (lit. "all as one, like those of Fuenteovehuna") is the text of the drama of the same name by Lope de Vega (1614), which glorifies the feat of the inhabitants of the village of Fuenteovehuna, who unanimously rebelled against the cruel commander.

Phraseology "*Las bodas de Camacho*" (lit. Camacho wedding) is used to express a positive assessment that characterizes any event, celebration, distinguished by luxury, scope, abundance of delicious food. The origin of this phraseology is connected with the XX-XXI chapters of the second part of "Don Quixote", which tells about the failed wedding of Cytheria with the rich man Camacho and about the wedding meal that could saturate the whole army: *Para celebrar la*

buenamarcha de la empresa, el jefe nos ha invitado a unacomilonaespléndida. Parecían las bodas de Camacho [8, 429–430].

"To celebrate the success of the company, the boss invited us to a luxurious banquet. It's just like Malan's wedding".

Phraseological Units That Include National Precedent Names

Among the verbal precedent names, one can distinguish first of all Don Quixote, the main character of M. Cervantes' immortal novel "The Cunning Hidalgo Don Quixote of La Mancha", whose name is used in a phraseological comparative that characterizes a naive, noble idealist: "portarsecomo un quijote" (lit. "Behave like Don Quixote").

On the other hand, the large volume of the novel and the complexity of the perception of the text itself served to create a negative ethical assessment of "tedious, boring": "*sermáspesado que el Quijote*" (lit. "to be heavier than Don Quixote"). Even the name of Rocinante, Don Quixote's nag, is used in Spanish comparisons with the meaning of the negative aesthetic assessment of an "extremely thin man": "*sermásflaco que el caballo de Don Quijote*" (lit. "to be more skinny than Don Quixote's horse").

As Yu.A. Rylov notes, the name of Don Quixote's squire, Sancho Panza, is used mainly with the meaning "practical man, without ideals" ("como Sancho Panza"), as well as when describing a fat man [3, 82]. The standard of bravery for Spaniards, and therefore the source of a positive ethical assessment is the proper name of the national hero of Spain, one of the most prominent figures of the Reconquista, Rodrigo Diaz de Vivar, nicknamed Cid, sung in the poem "The Song of my Cid" (III in.): "*sermásvaliente que el Cid*" (lit. "Be braver than Sid").

The name of Lasarillo, a tramp and a ragamuffin, the main character of the famous anonymous roguish novel of the XX century."The life of Lasarillo from Tormes": his misfortunes and misadventuresbegan to be used as an image-standard of negative aesthetic evaluation of the "dirty man": "*tenermásmierda que los pies delLazarillo*" (lit. "Having more shit than Lasarillo's legs").

The name of the main character of the comedy of the same name by the Spanish playwright Agustin Moreto (1618-1669) Diego in the phraseology "*el lindo don Diego*" (lit. handsome don Diego) is used to negatively characterize a vain, self-in love man who devotes too much time to his appearance: "*¡Porahíva el lindo don Diego, todocompuesto y creyéndose que todo el mundo se da la vuelta para mirarlopor lo guapo que es*" [8, 264]. "Here comes our handsome man, just like Don Diego, dressed up and imagining that everyone is looking at him, admiring his beauty".

Phraseological units that include elements of folk mythology, beliefs, signs, pre-scientific ideas about a person and the world around him;

A hot-tempered, irritable person is likened to a legendary monster in the form of a dragon, presumably from Galicia or Leon, associated with the times of pagan cults "*Fiera Corrupia*" (lit. "The beast of Corruption"): "*Ten cuidado con Juan, porquecuando se enfada se pone hechounafieracorrupia y no se sabecómova a reaccionar*" [8, 342]. "Beware of Juan, because when he gets angry, he becomes ferocious like a beast, and no one knows how he will react further".

Among the characters of Spanish mythology, one can note the Martinique brownie. So, in Castile, this brownie lives in some houses, hooligans, makes noise, hides things of family

members, but always helps them in solving difficult life issues. In Aragon, when the children are put to bed, they call Martinico, who is responsible for dreams: "*YavieneMartinico*" ("here comes Martinico") [4, 180].

Liver and kidneys in many cultures were considered a symbol of vitality and courage. This symbolic meaning is reflected in the Spanish phraseological units "*ser de/tener (muchos) hígados/riñones*" (lit. "Have/a lot of liver/kidneys")*"¡Quétíos! —piensa,—¡hay que tenermuchosriñones!*" [9, 50]. "These are men! - he thinks, - you need to be very brave!" The ideas of medieval medicine that black bile, located in the liver and spleen, is a source of melancholy and anger is reflected in the phraseology that characterizes an evil person: "*tenermaloshígados*" (lit. "Have a bad liver").

Phraseological Units That Include Elements Of Material Culture

Phraseological units with a gastronomic component are one of the important fragments of the Spanish language picture of the world, characterizing a person and the world around him from the position of the national worldview.

Among the snacks of the national Spanish cuisine, the main delicacy is considered to be "*jamon*" (dried pork ham), presented depending on the method of preparation and the breed of pigs in two varieties: *jamón serrano* (lit. "Mountain jamon") and "*jamónibérico/patanegra"* (lit. "Iberian jamon/black leg");

The Spanish linguistic consciousness distinguishes both positive and negative characteristics in this gastronomic image. Thus, the excellent taste qualities of jamon, which create a positive hedonistic assessment, stimulate the appearance of a general positive assessment in the phraseology "*pasarlojamón*" (lit. "To spend time like hamon", "have a great time"): "*Hoy estuvimostoda la tardeen la cerveceríabailando y lo pasamosjamón*" [12, 140]. "Today we danced all evening in a beer bar and had a great time". Phraseological units "*estarjamón*" (lit. "to be a jamon") and "*jamón serrano*" (lit. "Mountainjamon") form a positive aesthetic assessment: *"¡Rebonita, jamón serrano!"*[10, 162]

As you can see, in the examples given in the article, various metaphors belonging to certain cultural codes are observed. According to V.V. Krasnykh, "the code of culture can be defined as a "grid" that culture "throws" on the surrounding world, divides, categorizes, structures and evaluates it" [1, 5-6]. Being essentially universal, the codes of culture find their embodiment in phraseological units marked with national-cultural specifics, forming a national linguistic picture of the world.

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A BRIEF DESCRIPTION ON BIOSENSORS AND ITS APPLICATIONS

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ABSTRACT

Biosensors of different kinds, such as enzyme-based, tissue-based, immunosensors, and DNA biosensors, as well as thermal and piezoelectric biosensors, have been discussed to emphasize their importance in a variety of areas. The food industry uses biosensors to monitor quality and safety, as well as to distinguish between natural and artificial ingredients; the fermentation industry uses biosensors in the saccharification process to detect precise glucose concentrations; and metabolic engineering uses biosensors to enable in vivo monitoring of cellular metabolism. Biosensors and their significance in medical research, such as early detection of human interleukin-10, which causes heart disease, and fast detection of the human papillomavirus, are essential issues to consider. Fluorescent biosensors are important in drug development and cancer research. In the field of plant biology, biosensor applications are often used to identify missing connections in metabolic pathways. Defence, the healthcare sector, and maritime applications are among the other uses.

KEYWORDS: *Biosensors, Enzyme Based Immunosensors, Tissue Based Immunosensors.*

1. INTRODUCTION

Analytical gadgets that transform a biological reaction into an electrical signal are known as biosensors. Biosensors should ideally be extremely specific, independent of physical factors like pH and temperature, and reusable. Cammann invented the term "biosensor," and the International Union of Pure and Applied Chemistry (IUPAC) defined it.Biosensor fabrication, materials, transducing devices, and immobilization techniques all need interdisciplinary study in chemistry, biology, and engineering. Biosensor materials are divided into three categories depending on their mechanisms: biocatalytic, which includes enzymes, bioaffinity, which includes antibodies and nucleic acids, and microbe-based, which includes microorganisms[1]–[3].

Types of Biosensors:

The pioneers Clark and Lyons invented biosensors in the 1960s. Enzyme-based, stem - cell, immunosensors, DNA biosensors, and thermal and piezoelectric biosensors are among the many kinds of biosensors utilized.Updike and Hicks published the first enzyme-based sensor in 1967. Immobilization techniques, such as van der Waals forces, ionic bonding, or covalent bonding, have been used to develop enzyme biosensors. Oxidoreductases, polyphenol oxidases, peroxidases, and aminooxidases are some of the most frequently utilized enzymes for this purpose.

Diviès created the first microbe-based or cell-based sensor. Plant and animal tissues are used to make tissue-based sensors. The analyte of interest may be either a substrate or an inhibitor of these activities. The first tissue-based sensor for the measurement of the amino acid arginine was created by Rechnitz. Membranes, chloroplasts, mitochondria, and microsomes were used to create organelle-based sensors. However, although the stability of this kind of biosensor was good, the detection time was longer and the specificity was lower[4], [5].Immunosensors are based on the fact that antibodies have a high affinity for their antigens, meaning they selectively attach to diseases or poisons, or interact with immune system components of the host. Single-strand nucleic acid molecules can identify and attach to their counterpart strand in a sample, which is how DNA biosensors work. The connection between the two nucleic acid strands is owing to the creation of stable hydrogen bonds.

Magnetic biosensors: Miniaturized biosensors that use the magnetoresistance effect to detect magnetic micro- and nanoparticles in microfluidic channels have a lot of promise in terms of sensitivity and size.

Thermal biosensors, also known as calorimetric biosensors, are created by incorporating biosensor materials with a physical transducer.The quartz crystal microbalance and the surface acoustic wave device are two kinds of piezoelectric biosensors. They are based on the detection of changes in a piezoelectric crystal's resonant frequency as a result of mass changes in the crystal structure.Optical biosensors are made up of a light source and a number of optical components that work together to produce a light beam with particular properties and direct it to a modulating agent, a modified sensing head, and a photodetector.

The creation of genetically encoded biosensors has been helped by the discovery of green fluorescent protein and subsequent autofluorescent protein (AFP) variations and genetic fusion reporters. This kind of biosensor is simple to construct, modify, and implant into cells. Another example is a single-chain FRET biosensor. They are made up of a pair of AFPs that, when placed close together, may transmit fluorescence resonance energy between them. Depending on the strength, ratio, or duration of AFPs, several techniques for regulating variations in Förster resonance energy transfer (FRET) signals may be employed. Synthetic chemistry is used to make peptide and protein biosensors, which are then enzymatically labeled with synthetic fluorophores[6], [7].

Applications Of Biosensors:

Biosensors have been used in a variety of sectors, including the food business, the medical profession, and the marine sector, and they offer greater stability and sensitivity than conventional techniques.

- **Monitoring, Food Authenticity, Quality, And Safety In Food Processing:**

The quality and safety of food items, as well as their maintenance and processing, is a difficult problem in the food processing business. Traditional chemical experimentation and spectroscopic methods have flaws owing to human tiredness, are costly, and time consuming. The food sector would benefit from cost-effective alternatives for food authentication and monitoring that include objective and consistent measurement of food items. As a result, the development of biosensors in response to the need for simple, real-time, selective, and low-cost methods seems to be advantageous.Pathogens in food may be detected using biosensors. A bioindicator of faecal contamination in food is the presence of Escherichia coli in vegetables. Using potentiometric alternating biosensing devices, E. coli was detected by detecting changes in pH induced by ammonia (made by urease–E. coli antibody conjugate). The liquid phase is obtained by washing vegetables such as sliced carrots and lettuce in peptone water. The mixture is then amalgamated in a sonicator to separate bacterial cells from food components[8]–[10].

- **During The Fermenting Process:**

Process safety and product quality are critical in the fermentation industry. To design, improve, and maintain biological reactors at optimum effectiveness, effective fermentation process monitoring is required. Biosensors may be used to evaluate process conditions indirectly by monitoring the presence of products, biomass, enzymes, antibodies, or by-products. Because of their simple instrumentation, impressive selectivity, cheap costs, and ease of automation, biosensors accurately regulate the fermentation sector and provide repeatable results. Several types of commercial biosensors are now available; they can detect biochemical parameters (glucose, lactate, lysine, ethanol, and so on) and are extensively utilized in China, accounting for almost 90% of the market.

The old Fehiing's technique was used to check saccharification throughout the fermentation process. Because this technique requires decreasing sugar titration, the results were incorrect. The fermentation industries, on the other hand, have profited since the commercial introduction of glucose biosensors in 1975. Glucose biosensors are now used to regulate production in the saccharification and fermentation workshop, and the bioenzymatic technique is used to generate glucose.

- **BiosensingTechnology For Long-Term Food Security:**

The terms "appearance," "taste," "odor," "nutritional value," "freshness," "flavor," "texture," and "chemicals" all relate to the appearance, "taste," "odor," "nutritional value," "fresh When it comes to food quality and safety, smart nutrient monitoring and quick screening for biological and chemical pollutants are critical. Material science, nanotechnology, electromechanical systems, and microfluidic systems are all marching forward to make sensing technology a reality. Efforts are being made to create control systems that ensure food quality and safety, as well as human health as a result.

Because the meal quantity and composition may change during storage, glucose monitoring becomes essential. German looked into how gold nanoparticles (AuNPs) changed the electrochemistry of glucose oxidase mounted on a graphite rod, improving its sensitivity.

- **In The Medical Profession:**

Biosensor applications are fast expanding in the field of medical research. Glucose biosensors are often employed in clinical applications for the diagnosis of diabetes mellitus, which necessitates accurate blood-glucose management.Home use of blood-glucose biosensors

accounts for 85 percent of the massive global market.In the medical sector, biosensors are widely employed to detect infectious illnesses. A potential biosensor technique for diagnosing urinary tract infections (UTIs), pathogen identification, and antimicrobial susceptibility is being investigated.

- **Biosensors That Glow In The Dark:**

Fluorescent biosensors are imaging agents that may help in cancer research and medication development. They've opened up new perspectives on the function and control of enzymes at the cellular level. FRET biosensors based on GFP and genetically encoded play an important role. Fluorescent biosensors are tiny scaffolds onto which one or more fluorescent probes are attached through a receptor (enzymatically, chemically, or genetically). The receptor recognizes a particular analyte or target and sends out a fluorescent signal that may be detected and quantified.

Fluorescent biosensors can detect ions, metabolites, and protein biomarkers with high sensitivity, as well as report on the presence, activity, or status of the target (serum, cell extracts) in a complicated solution. In areas including signal transduction, transcription, cell cycle, and apoptosis, they're used to look at gene expression, protein localization, and conformation. These sensors are used to detect arthritis, inflammatory disorders, cardiovascular and neurological diseases, viral infection, cancer, and metastases.

- *Applications in biodefense biosensing:*

In the event of a biological assault, biosensors may be utilized for military reasons. The primary goal of such biosensors is to sensitively and selectively detect biowarfare agents (BWAs), such as bacteria (vegetative and spores), poisons, and viruses, in practically real time. Several efforts have been made to develop such biosensors utilizing molecular methods that can detect the chemical markers of BWAs.Nucleic acid-based sensing systems are more sensitive than antibody-based detection techniques because they offer gene-based specificity without the need for amplification stages to achieve the necessary levels of detection sensitivity.

- **In The Field Of Metabolic Engineering:**

Concerns about the environment and the lack of long-term viability of petroleum-derived goods are progressively driving the need for the development of microbial cell factories for chemical synthesis. Metabolic engineering, according to researchers, is the enabling technology for a sustainable bioeconomy. They also believe that, rather of depending on petroleum refining or plant extraction, a significant portion of fuels, commodity chemicals, and medicines will be generated from renewable feedstocks by using microorganisms. The great potential for variety creation necessitates the use of effective screening techniques to identify individuals who have the desired trait. The previous techniques used spectroscopy to analyze enzymatic assays, but they had a low throughput. To overcome this barrier, genetically encoded biosensors for in vivo cellular metabolic monitoring were created, with the potential for high-throughput screening and selection utilizing fluorescence-activated cell sorting (FACS) and cell survival, respectively.

- **Plant Biology Biosensors:**

Advances in plant research have been made possible by revolutionary new technologies in the fields of DNA sequencing and molecular imaging. Traditional mass spectroscopy techniques for determining cellular and subcellular localization and measuring ion and metabolite levels were

very precise, but they lacked crucial information on the location and dynamics of enzyme substrates, receptors, and transporters. Biosensors, on the other hand, can readily tap into this information. We need to devise methods to visualize the real process, such as the conversion of one metabolite into another or the activation of signaling events, in order to assess a dynamic process under physiological circumstances. Sensors that react dynamically may help with this representation.

2. DISCUSSION

Biosensors are devices that detect analytes by combining a biological element with a physiochemical detector. These devices may be used in a variety of settings, from clinical to environmental and agricultural. Using nitrite and nitrate sensors, biosensors are utilized in marine applications to detect eutrophication. For organism identification, several sensors based on nucleic acid hybridization detection have been developed. In addition to the food sector, the instruments are utilized in industrial processing and monitoring. The kinds of biosensors discussed in this article include electrochemical biosensors, thermometric biosensors, optical biosensors, piezoelectric biosensors, whole cell biosensors, and immuno-biosensors. Biosensor applications are also discussed in this article.

3. CONCLUSION

Genetically modified proteins are injected into cells ex vivo or in vivo to create cell and tissue-based biosensors. Using biophotonics or other physical principles, they enable the researcher to constantly and noninvasively detect levels of hormones, medicines, or poisons. In this respect, the scope may be useful in ageing studies.Using nitrite and nitrate sensors, biosensors are utilized in marine applications to detect eutrophication. Various sensors based on nucleic acid hybridization detection have been developed for organism detection; the Monterey Bay Aquarium Research Institute's "Environmental Sample Processor," which aims to automate toxic algae detection in situ from moorings using ribosomal RNA probes, is a promising development in this field. One of the main objectives is to use biosensors to detect pollution, heavy metals, and pesticides. The use of nanoparticles in biosensors opens the door to the development of a new generation of biosensor technologies. Nanomaterials enhance the mechanical, electrochemical, optical, and magnetic characteristics of biosensors, paving the way for single-molecule biosensors and biosensor arrays with high throughput.Future research should concentrate on deciphering the mechanism of interaction between nanomaterials and biomolecules on the surface of electrodes or nanofilms, as well as using unique characteristics to create a new generation of biosensors. Nanomaterial-based biosensors, on the other hand, have a lot of promise and will soon be widely used in clinical diagnostics, food analysis, process control, and environmental monitoring.

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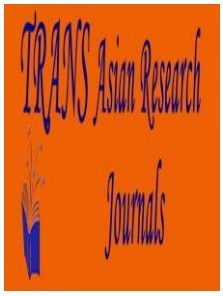

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METHODS AND PRINCIPLES OF FORMATION OF SPIRITUALITY IN PRIMARY SCHOOL STUDENTS

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ABSTRACT

Spirituality is the separation from unfounded, crude sexual interests, the pursuit of inner perfection, spiritual exaltation. Spirituality - in the most general sense - is the generality of the manifestation of the spirit in the world and in man. In sociology, cultural studies, and often journalism, "spirituality" is often expressed in the form of moral values and traditions, usually referred to as the unifying principles of a society, integrated into religious teachings and practices. Therefore, the object of the article is spirituality, and the inculcation of spirituality in primary school students is taken as a theoretical basis.

KEYWORDS: *Spirituality, Spiritual Nourishment, Folklore, Fairy Tales And Epics, Proverbs And Sayings, Children's Folklore.*

INTRODUCTION

Spirituality is a tradition that is passed down from generation to generation, respect for oneself, and the people around us, the environment and nature. Spirituality is nurtured in the family.The stronger the family, the stronger the bonds between generations, the better the chances of nurturing a spiritually mature person. Spirituality is a spiritual quality that consists of the supremacy of spiritual, moral, and intellectual interests over material interests.

Folklore is the basis of folk pedagogy, and examples of folklore are given in the primary grades of secondary schools. After all, culture, art, languages are the main factors in the development of a nation as a nation. Folk art is an integral part of culture, art and language. Therefore, it is no coincidence that in the "National Program of Personnel Training" of the Republic of Uzbekistan, adopted in 1997, "Spiritual and educational work" was approved as a separate section. It emphasizes the development and implementation of effective organizational, pedagogical forms and tools for the spiritual and moral education of the younger generation, based on the rich

national cultural and historical traditions, customs and universal values of the people. [http://library.ziyonet.uz/uz/book/66551].

At present, a vague but meaningful and in many respects exemplary historical experience has been formed in the upbringing of the spiritual and moral sphere of the individual as a whole, both theoretically and practically. The study and generalization of this experience from a historical perspective will actively help to solve the research problem.

The spiritual and moral education of schoolchildren is aimed at "raising the heart" of the child as the center of his spiritual life. It is the process of organizational, purposeful, external and internal (emotional and heart) influence of the teacher on the spiritual-moral sphere, which is the basis of the inner world of the person. This effect is complex, combined with a person's feelings, desires, and thoughts. It is based on a certain system of values that is embedded in the content of education and implemented by a particular position of the teacher.

The implementation of spiritual and moral education in the secondary school can be carried out on the basis of the human values of the content of education, the system of additional education outside the classroom.

The goal of modern verbal, incomplete and soulless pedagogy has its own meaning only when it is to understand the meaning of human life, to reveal the characteristics of the human spirit. To consciously develop (teach and nurture) the human soul, one needs real knowledge of its nature, laws, meaning, and evolutionary purpose. Therefore, it is necessary to study and teach spiritual science, theo-cosmos-anthropogenesis, history of religions, art, world civilizations, cultural studies, logic, ethics, aesthetics, applied psychology, acme ology, vale ology and other sciences. Theories and practices of the human spirit, without which the absolute meaning of life and pedagogy cannot be realized and put into practice;

Each student is approached on an individual basis, not on an individual basis. You don't have to work at school, you have to serve. Education is the food of the spiritual foundation. For this bullet the child was born. The child's spiritual axis is nourished by high images, experiences, and understanding them: love, compassion, respect, empathy, science, as a result of which he has integrity based on fundamental motivations, service consciousness, creativity, activism, and love for the world will be. Higher images and experiences form the original basis of the spiritual experience.

The process of reproduction of morality in society is incorporated into all sorts of social activities and is carried out in this way. In general, it is self-sustaining and promotes targeted influence and conscious control, mainly in the form of self-education, self-improvement. No one has the privileged authority to act on behalf of ethics, to represent the interests of society in this area. Each person has such a privilege and duty, and as a socially active intelligent being, he takes full responsibility for his moral formation and development.

Man can influence his moral development by developing certain behaviors, attitudes, moral qualities. What actions, Aristotle said, are the moral qualities of man.

Spiritual and moral education is aimed at "developing the heart" as the center of a child's spiritual life. It is the process of organizational, purposeful, external and internal (emotional and heart) influence of the teacher on the spiritual-moral sphere, which is the basis of the inner world of the person. This effect is complex, combined with a person's feelings, desires, thoughts.

We all go from childhood to a great life full of joys and sorrows, happiness and sorrow. The ability to enjoy life and to face challenges with courage is formed from early childhood. Children are sensitive and receptive to everything around them and they achieve a lot. To be kind to people, you need to learn to understand others, to show compassion, to admit your mistakes honestly, to be diligent, to marvel at the beauty of the nature around you, to treat it with care. Of course, it is difficult to list all the moral qualities of a person in the society of the future, but the main thing is that these qualities should be decided today.

It should be noted that the formation of ethical concepts is a very complex and lengthy process. This requires the constant effort of adults, systematic and systematic work to shape children's emotions and consciousness.

We believe that the use of folklore is the most effective and fun for primary school students.

The moral purity and charm of folk ideas embodied in the heroes of many fairy tales and epics, the folk wisdom of proverbs and sayings, the charm of riddles, the cheerful jokes of many of the oral works of the Russian people - all this reveals its history. a path to the heart and mind of the little reader.

"Collect study and process our folklore," said Gorky.

Folklore is poetry created by the people and dominating the public, reflecting their knowledge of labor, social and domestic life, life, nature, culture, and faith. Folklore embodies the views, ideals and aspirations of the people, their poetic imagination, the richest world of thought, emotions, experiences, dreams of justice and happiness. Folk poetry dates back to ancient times, people did not know how to write, so naturally, the form of oral expression was peculiar to him. It is an oral, verbal artistic creation that emerges in the process of the formation of human speech.

Folk oral art always meets the needs of people, is a reflection of the collective mind, the accumulated life experience. In it, long before the emergence of pedagogy as an academic science, folk pedagogy was formed - a system of education from birth to the transition to another world.

"People," wrote G.M. Vinogradov, "about life, the upbringing and education of the rising generation, the well-known goals and objectives of education and training, their specific means and methods of influence." had certain views. younger generations and others. Their commonality and interdependence give them what should be called folk pedagogy. ”

The high results of raising children in a popular environment are one of the most important topics in the science of pedagogy. Revealing the secrets of public education can shed light on the peculiarities of the pedagogical culture of the people and the country as a whole. The people respected the inner potential of man, his independence and personal responsibility for his behavior. Folk pedagogy is characterized by behavior, work ethic, so the best educators were usually the people most capable of a particular type of activity: artisans, singers, storytellers, and so on.

There is a special branch of folk art called children's folklore, which, according to the greatest researcher G.S.Vinogradov, was applied "almost exclusively to the pedagogical needs of the people." These are the same “needs” that are central to joint pedagogy - caring for a child's

physical, mental, and moral upbringing, that is. caring about nurturing a physically and mentally healthy person.

Children's creativity is based on imitating its moral characteristics, especially as an important factor in a child's development. The task of the teacher is to inculcate in children the tendency to imitate, to inculcate skills and abilities that are impossible to carry out creative activities without them, to teach them independence, to be active in applying these knowledge and skills, to form critical thinking. Thinking, purposefulness, positive character traits, models of correct behavior.

Children's folklore belongs to the minor folklore genres. These are the most interesting and richest works of folk art in terms of their educational nature:

Fairy tales as a work of art and literature are a field of theoretical generalization in many fields of knowledge at the same time. They are a treasure trove of folk pedagogy because many of them have pedagogical ideas.

Leading Uzbek teachers have always had a high opinion of the educational and pedagogical significance of folk tales, emphasizing the need for their widespread use in pedagogical work. Fairy tales about animals are taught more in the primary grades. Tales such as "The Tale of the Wolf as a Doctor" (A. Obidjon) [3, 70], "The Fox with the Eye" [3,51] are taught and analyzed in the form of clear life stories.

Tales are an important educational tool that has been developed and tested by the people over the centuries. Life, the practice of public education has convincingly proved the pedagogical significance of the fairy tale. Children and fairy tales are inseparable, they are created for each other, so getting acquainted with the fairy tales of their own people must be included in the education and upbringing course of every child.

Small forms of folklore instill in people a love for the Motherland, the understanding of work as the basis of life, social relations in society, the protection of the Motherland, the appreciation of culture.

All genres of folklore are tools of folk pedagogy, aimed at the spiritual and moral upbringing of the younger generation. Traditionally, upbringing has focused on developing a sense of femininity in girls and masculinity in boys.

Boys are taught from childhood to be stable and calm in the expression of emotions, in word, in action, in firm character, perseverance, agility, strength, courage, bravery, and so on.

Special attention was paid to the upbringing of girls in the family. From early childhood, the girl was taught household skills first in play and then in real life: cooking, sewing, washing, washing, and so on. By the age of 13-15, the girls were already ready. for independent living.

Games played an important role in the development of physical strength, agility, intelligence and military skills.

This means that the upbringing of girls and boys from an early age on the basis of folk pedagogy is different, corresponding to the roles of men and women with appropriate sexual characteristics.

Raising boys is aimed at developing qualities such as agility, courage, strength, reaction speed.

Girls were accustomed to such actions, which nurtured patience, the ability to set up and equip life. Girls are brought up with such qualities as loyalty, thrift, kindness.

Folk pedagogy also implies a special attitude to women - mothers. From childhood, girls are gradually preparing for this honorable role - motherhood. We can find the opposite in proverbs and sayings:

Bolaliuybozor, bolasizuymozor

Children's home is as a market, childless home isa cemetery.

Although folk traditions have changed significantly in recent times, modern life sometimes requires flexibility of thinking, the ability to reconstruct, the principle of raising children has been preserved, focused on the development of masculine qualities in men and women - girls.

In the current situation, the education of schoolchildren on the basis of folk pedagogy should be aimed at combining all the best from it with the demands of today's life.

The femininity of a girl, skillful hands, thrift, kindness - the future woman, mother, and caretaker will always be valued and appreciated.

The intelligence, strength, courage, perseverance, and ability to nurture a family and their offspring in men have always been valued and valued.

In this article, we have considered the possibility of using proverbs and sayings from this genre of folklore, created by folk pedagogy, as well as texts about the national beliefs of the Uzbek people in the spiritual and moral education of primary school children. Analyzed the role. In short, folk art is a complex of wisdom for all, young and old. Over the centuries, even though the issues of education have been artistically expressed in the works of our great scholars, folklore works, which are the product of folk thinking, continue to be of universal significance, and such spiritual views are ingrained in children's minds from an early age.

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SOME ASPECTUAL CHARACTERISTICS OF THE SPANISH VERB

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ABSTRACT

The functional-semantic field of aspectuality as a set of means of expressing aspectual meanings and meanings is characteristic of all languages. The article discusses the main characteristics of the Spanish verb in the framework of the theory of functional grammar. Functional grammar is a branch of linguistics based on the study of universal categories of language. This is a grammar aimed at studying and describing the functions of the units of the language structure and the laws of the functioning of these units. Grammar of this type considers in a single system the means belonging to different tiers of the language, but united on the basis of the commonality of their semantic functions.

KEYWORDS: *Aspectuality, Spanish, Theory Of Functional Grammar, Grammatical Categories.*

INTRODUCTION

Functional grammar is a branch of linguistics based on the study of universal categories of language. This is a grammar aimed at studying and describing the functions of the units of the language structure and the laws of the functioning of these units. Grammar of this type considers in a single system the means belonging to different tiers of the language, but united on the basis of the commonality of their semantic functions.

When analyzing linguistic material, the approach "from semantics to its formal expression" ("from functions to means", the so-called onomasiological approach) is used as the main determinant of grammar construction, combined with the approach "from form to semantics" ("from means to functions").

The basic concepts of functional grammar are semantic category (functional-semantic category) and functional-semantic field. The fields lying in the field of the study of functional grammar include such as the field of intensity, locativity, temporality, comparativity, etc.

In Russian linguistics, within the framework of the theory of functional grammar, the concept of aspectualityis considered, which is interpreted as a functional-semantic category that unites multi-level linguistic means. Aspectualityis understood as a semantic categorical feature that conveys the nature of the flow and distribution of action over time.

Aspectuality is a functional and semantic field constructed by interacting linguistic means: morphological, syntactic, word-formation, lexical-grammatical, lexical and their various combinations, united by the commonality of semantic relations, i.e. relations, the content of which is to convey the nature of the flow and distribution of action in time.

According to A.V. Bondarko, aspectual meanings are concentrated primarily in the sphere of the verbal predicate, in the sphere of action, since aspectuality goes beyond the limits of the action-predicate. The aspectual characteristic is characteristic not only of the predicate, but also of the utterance as a whole. Therefore, we can talk both about the aspectual characteristic of the predicate, and about the utterance as a whole [1. p. 10].

Y.S. Maslov identifies two spheres of aspectual meanings: 1) qualitative and 2) quantitative aspectuality. The system of categories of qualitative aspectuality in Y.S. Maslov opens by dividing all phenomena into static (states, relationships) and dynamic (actions). Dynamic phenomena break up on the basis of the orientation of an action to its “internal” limit, into groups of marginal and non-marginal predicates. Limit predicates, in turn, are divided into actions that have reached the limit and actions that have not reached the limit [2. p. 12].

Unlike qualitative aspectuality, the categories of quantitative aspectuality, which include multiplicity, duration and intensity, are not united by a common semantic idea, but are recognized as “of different quality” and logically heterogeneous, as evidenced by the possibility of their combination within the same lexeme, i.e. they characterize the same action, but from different sides.

The main categories of aspectuality listed above, originally identified on the material of Slavic languages, and are also implemented in Spanish.

The category of aspectuality in Spanish is transmitted through a system of forms and meanings of tenses, which include the concepts of the limitation/unlimited duration of action, its duration and singleness, multiplicity and punctuality, limit and non-limit, that is, through the elements of aspectuality.

Many Spanish grammarians (I. Andres-Suarez, E. Alarcos-Yoranch, A. Bello) believe that with the exception of the simple past tense - *PretéritoIndefinido*, for example, *canté*, all other simple tenses mean an incomplete action, more precisely, there is no indication of the limited duration of the action, i.e. these forms express shades of meaning of an imperfect kind. In turn, all complex time forms and simple past tense (*he cantado, habíacantado, hayacantado*, etc.) convey a time-limited and in this sense complete action. Therefore, their values contain shades of perfect appearance. The opposition between simple and complex tenses presents opportunities for the Spanish language to express specific, aspectual shades.

Analytical verb constructions (turns, periphrases) are very common in Spanish. Many of them are also associated with the transmission of species shades. For example:*estar* + *gerundio, seguir* + *gerundio* (*estarescribiendo, seguircantando*). The verb *estar* + gerund is to do something at the moment, *seguir* + gerund is to continue doing something (to write at the moment, to continue singing).

Specific shades are also manifested in the semantics of some verbs, primarily those that express a certain mode of action. It is believed that such verbs have a lexical category of the mode of action.

So, V.S. Vinogradov [3. P. 98] leads one of the most common classifications Spanish verbs expressing manner:

– The effect is immediate (one-time, single-point) – *saltar, llamar, firmar, chocar, decidir*, etc.;

– The effect of repeated (recurring) – *golpear, picotear, pestañear, hojear, frecuentar*, etc.;

– The effect of long-term (imperfecto, unsaturated) – *saber vivir, querer, contemplar, knowing, respetar*, etc.;

– The action of the ultimate (perfect) – *nacer, morir, acabar, concluir*, etc.;

– Actionnacionalnoe (inchoative) – *amanecer, enrojecer, comenzar, empezar, alborear*, etc.;

– Action terminative (finetune) – *cesar, terminar, acabar, dejar(de)*, etc.;

– Action Stateline (expressed as) – *dormir, alegrarce, descansar, aburrirse*, etc.

Spanish linguists Pedro HenriquesUrena and Amado Alonso in "GramáticaCastellana" [4. p. 139] propose the following division of verbs according to the mode of action they express: first of all, verbs are divided by them into perfect and imperfect, i.e. into expressing an action that does not need completeness in order to become complete: *brillar, querer, saber, oir, ver, nadar* etc.; and those whose action is not complete, if it is not finished: *saltar, salir, entrar, terminar, comer, hacer, morir* etc.

But here, scientists note that such a division of verbs into perfective and imperfective is more in line with the generally accepted, international view of this problem, being terms of comparative linguistics.

Urena and Alonso offer their own classification, which is more acceptable and reflects, in their opinion, the realities of the Spanish language better. It is proposed to divide verbs into permanent (*permanentes*) and so-called desinate (*desinentes*).

Permanent verbs mean a complete and prolonged action, for example:*brillar, querer, saber* (to shine, to want, to know), *desinate* (derived from Latin desinere, terminar) - mean a complete action, for example:*nacer, morir* (to be born, to die). These definitions most closely coincide with the definitions of marginal and non-marginal verbs accepted in linguistics.

Another classification is proposed by the Spanish grammarian Jose Roca Pons [5. p. 385]. This linguist distinguishes three aspects of the consideration of action (Aktionsarten) – three ways of proceeding of action, respectively, three forms of the past tense:

1. Imperfective (*imperfectivo* - imperfect, imperfect);

2. Punctual (*puntual* - simple past);

3. Perfective (*perfectivo* - complex past).

Considering the question of the expression of the category of species in Spanish, Roca Pons suggests focusing on verbal periphrases - descriptive constructions that are very important from the point of view of the expression of species (*irhaciendoalgo* – gradual development of action, *volver a haceralgo* – repetitive action).

M. Alonso believes the following: “The verb form is usually included in the grammatical category of tense. The verb, by itself, denotes the process of action, as well as phenomena associated with the manifestations of the human soul and the objects of the reality surrounding us, has different types, judging by the beginnings or the limit, which it expresses perfectively or imperfectly”.

M. Alonso, who, along with the aspect of verbal action (*aspectodelhecho verbal*), explores the method of verbal action (*manera del hecho verbal*), which, as he writes, “comes from the semantic content of the verb itself... According to the mode of action, the verb has the meaning of incoativity, perfectivity, iterativity, etc., and according to the aspect of verbal action, certain signs give it the character of inhoativity, perfectivity, iterativity, etc”[4. p. 39].

It is noted that recently a comprehensive study of the aspectual capabilities of the Spanish language has led to a revision of the concept of the mode of action in Spanish studies. It began to be associated not so much with the nature of the verb lexeme itself, as with the modification of its meaning under the influence of various contextual means.

So, in Spanish, all the main differences of a specific nature take place only if there are discrepancies in temporal values, therefore, the allocation of the category of species as such is considered unjustified, and the various species shades manifested in the forms of tenses are interpreted as a secondary effect of temporal differences.

So, the Spanish system of verb tenses and lexico-semantic features of verbs have wide possibilities for transmitting a wide variety of temporal, aspectual and modal meanings, meanings and shades.

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THE CONCEPT OF INTENSIFICATION OF EDUCATION WAYS TO ACTIVATE THE TEACHING OF RUSSIAN FOR NON-PHILOLOGICAL STUDENTS

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ABSTRACT

One of the most important ways to activate the learning process is to ensure that the components of the learning content are interconnected. Intensification of education is the transfer of large amounts of information with a constant duration of training, without reducing the requirements for the quality of knowledge. Intensification of education is to increase the productivity of teachers and students in each unit of time. This article also discusses the intensification of education, using the example of Russian language classes.

KEYWORDS: *Intensification of Education, Intensification, Efficiency, Individual-Typological Characteristics of Students, Teaching Technologies.*

INTRODUCTION

From the first years of independence, students of non-philological universities were taught Russian on the basis of dictionaries, grammars and texts in special subjects, as the preparation of first-year students in their specialties began. At the same time, attention was paid to the teaching of scientific speech syntax, methods of teaching types of speech activities were developed in the material of the field of professional communication [12, 3]. Textbooks in Russian were often based on the texts of the subjects studied at the university: both general scientific (mathematics, physics, chemistry) and highly specialized (materials science, geodesy, mechanical engineering, etc.) [9]. during this period, the term “language of specialization” was introduced and “began to be taught as a part of foreign language teaching, which provides educational, scientific and professional communication in the language of specialization in the educational institution” [8, 406].

In modern conditions, due to the transition of higher education institutions to the two-stage system of "bachelor-master" in the first stage of general education and special subjects, it is not possible to teach non-philological students the language of their specialty. This means that it is

necessary to reconsider the content of teaching Russian in non-philological universities. Profile language teaching refers to the teaching of the means of speech of the basic cycle sciences according to the university preparation profile, including general scientific dictionary, stylistic synonyms, and clichés used in educational literature, etc. Can provide communication within the first two years of study at the university, and then create a solid foundation that allows international students to independently master the material of special subjects in the future.

It is also necessary to intensify the process of teaching Russian as a foreign language, as it takes place in a target language environment, so foreign students can learn the language of the educational profile and the social sphere, in addition to learning the language of the educational profile they have to learn. To do this, the teaching of Russian as a foreign language should be carried out not only with textbooks on general and special sciences and articles of general scientific and narrow content, but also with works of art and journalism, films and videos. In this case, the intensification is done by working with more learning material in the group.

Addressing the language of the socio-cultural sphere of communication is important not only for educational and pedagogical purposes, but also because the teaching of the profile language is based on the language of this sphere.

In other words, a language that serves the social sphere of communication is the basis for mastering the language varieties necessary for other spheres of communication (the core of the field structure). The core space of the industry is formed as a result of mastering the general scientific language in school and language tools that serve the socio-cultural sphere of communication. In addition, the periphery of the field is formed in the subsequent vocational training, that is, the student learns the language of a particular field of study, and then the language of the specialty.

Intensification is the development of education, increasing the intensity of training. Intensity is one of the important indicators along with the efficiency, convenience, motivation and other parameters of the learning process. All of these parameters are appropriate for teachers and students seeking to ensure learning:

- Effective (successful), ie the results obtained in accordance with the objectives set by the cheapness of resources;

- Easy, ie not to overload teachers and students in the learning process;

- Motivation, ie for students to be interested in learning activities or to understand their importance;

- Intensive, ie to make the learning process as fast as possible.

Undoubtedly, the main among these parameters is the effectiveness of teaching, the indicator of which will be the quality of speech skills formed in the teaching of Russian as a foreign language. All other parameters, including the intensity of the training, are important, but additional parameters of the learning process will still be used during the training. Therefore, in pedagogical research, first of all, it is about increasing the effectiveness of training, and secondly, it is about increasing the intensity of training.

Yu.V.Vannikov and T.S. Kudryavtseva noted that the intensity of training is nothing more than the amount of work done in a given period of time. The intensity of training is directly proportional to the number of units of study for each individual unit of time and inversely

proportional to the number of units of time for a unit of study (the unit of study is specific to both units of linguistic material skills). In this case, intensification is understood as “an increase in the workload over a specified time interval or a decrease in the time interval with a set workload” [10, 49]. In this case, we are talking about changing the quantitative characteristics of the learning process, which is important only if the effectiveness of teaching is ensured.

This allows foreign non-philologists to teach Russian in the system of teaching Russian, when it is necessary to ensure the effectiveness of the educational process in the context of reduced teaching hours, that is, taking into account the conditions of the time. the program means teaching and teaching material that is no less successful than in previous years where academic hours are allocated. Accordingly, non-philological students are more likely to experience learning intensity (i.e., mastering more learning material, such as words), leading to learning effectiveness (high-quality speaking skills). Teaching methodology is needed. When measuring learning outcomes using this method, it is necessary to determine not only the qualitative characteristics of the learning process, such as the presence / absence of language errors, but also quantitative criteria, such as the number of words learned.

The organic link between training intensity and its effectiveness has also been noted by other scholars. For example, E.G. Azimov and A.N. Shchukin believes that this should be understood as “... one of the ways to increase the speed and quality of education”, “to strengthen labor productivity and quality of work” [8, 83]. B.A. Lapidus wrote: “Activating the learning process means increasing its efficiency, its‘productivity ’, without increasing the number of hours devoted to the subject” [13, 3]. A.A. Leontiev believed that learning can be activated in the educational process by creating the conditions for learning activities that have the most positive impact on its success [15, 88].

The scientific literature [11, 65] shows that the activation of teaching Russian as a foreign language can be achieved in different ways:

-Rationalization of the content of the subject "Russian language", in particular, the involvement of problem materials in the educational process;

-Rationalization and development of existing teaching technologies, in particular, the use of active teaching methods in order to ensure the intensity of communication in the classroom;

- Combining individual and group-group forms of classes;

- Systematic use of visual aids and teaching aids;

-Taking into account the individual-typological characteristics of students.

Let’s look at a few examples of intensification in relation to the training of non-philological students. First, it allowed distinguishing different profiles of education, in particular, engineering and technical education, taking into account the individual-typological characteristics of students [7, 52]. In addition, the individualization of the process of teaching students of technical specialties, taking into account their cognitive style, according to some researchers, has a positive effect on the acquisition of Russian as a foreign language [6, 132].

Second, experimentally determined and proven by many years of teaching experience: the intensive use of audiovisual and technical teaching aids: video films, computer programs, multimedia tools helps to intensify teaching Russian language to non-philological students . Textbooks on university profile [11, 47],

Third, intensive methods help to intensify the training of non-philological students, whose advantages include a large amount of material, taking into account the motivation to focus teaching on the practical needs of students. Already studied [17, 62]. The scientific literature, on the one hand, shows that intensive methods are most successfully applied in short-term teaching, and in the long-term education system of the university they are used in introductory and additional courses [14, 51]. On the other hand, a number of methods of intensive education have been noted to be easily transferred to ordinary (university, school) education [16, 145]. Shekhter and the method of activating the capabilities of the individual and the team G.A. Kitaygorodskaya. A.N. Shchukin emphasizes that intensive methods can be used in teaching communication in everyday, socio-cultural and general scientific fields, in particular, that teaching materials that implement the ideas of the emotional-semantic method include problem situations based on general scientific and specific foundations possible [18, 202-205].

Listing examples of accelerating teaching for non-philological students, we note that one of the most important ways to ensure the intensity of the educational process is to interconnect the components of the content of teaching Russian, which is not only rational selection of educational material and its placement in the educational process, as well as the development of rational teaching technologies. This does not preclude the simultaneous use of other methods of intensification, such as the involvement of technical training manuals, taking into account the specific features of the cognitive method of future engineers, increasing communication density, and so on.

In conclusion, although intensity is one of the important parameters of teaching, one of its quantitative features, in order to activate the educational process, it is necessary to take into account its qualitative aspect, the intensity of teaching Russian to non-foreign philologists. In order to provide, probably in different ways, often intensive methods, audiovisual and technical teaching aids, individualization of teaching are used.

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PARALLELIZATION OF DATA BUFFERING AND PROCESSING MECHANISM IN MESH WIRELESS SENSOR NETWORK FOR IOT APPLICATIONS

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ABSTRACT

IoT, being a subject of significant interest and significance for the future generations, includes various difficult and improving issues for the IoT application developers and researchers to work with. A wireless sensor mesh networking has emerged as an appealing alternative for broad variety of low-power IoT applications. This article demonstrates that how the data may be stored, received and processed parallelly by the parent node in the cluster from many sensor nodes, thereby decreasing the reaction time significantly. The usage of parallelized algorithm for the communication protocol optimized using OpenMP standards for multi-core architecture between the sensors and parent node allows various radio technologies to be utilized for an application which could not be more than one in case of serial processing. The suggested method has been tested for a wireless network application detecting temperature and moisture concentrations utilizing many sensors for which the reaction time is reported to be less than 10 ms. The article also covers in depth the hardware configurations for the application evaluated along with the findings shedding light on the parallel method for buffering and processing the messages. Finally, the study is completed by claiming the edge of parallel algorithm-based routing protocol over the serial in the light of graphical findings and analysis.

KEYWORDS: *Parallel Algorithm, Wireless, Sensor, Mesh Network Topology, Openmp, Iot.*

1. INTRODUCTION

Today, wireless sensor networks have become an essential component of the modern-day computer environment particularly in the area of communication and information sharing. These kinds of networks have found their existence and most importantly significance in variety of applications such as military surveillance and monitoring, home automation systems, mode of

transport like cars, airplanes, etc., industrial application like automating the machinery, environment analysis, weather predictions and many more[1]. The most significant use of wireless sensor networks is data gathering and processing. Owing to necessity of having high technical and computing in today's modern-day network situation, there is an increasing focus on data collecting in the wireless sensor networks[2].

Usually, huge or thousand numbers of sensor nodes are utilized for the gathering of data. Various techniques may be utilized for deployment of these nodes. The sensor nodes may be fixed or movable. The ultimate difficulty in this is how quickly the data can be processed and the results can be given back to the consumer. Keeping in mind the increased data availability and flow of information via the network, the requirement of applications is the immediate response to the actual world. This requires for some specific computing measures and method to be included in order to handle and compute such a big data in no time. In this paper, we come up with a concept of parallel read and data processing in an IoTbased application developed to read in the weather and moisture concentrations of an area.

The code for the program has been updated using the OpenMP standard for parallel processing using the parallel processing capability of multi-core architecture of contemporary computers. The paper has been modelled and organized into sections.

basic introduction to wireless networks, IoT-based applications and requirement of parallel processing in data buffering and reading. the wireless sensor mesh network design in short. Section 3 examines the different components of the network architecture. the applicability of parallel processing in reading and processing the data from sensor nodes parallelly in the network. Section 5 shows the experimental set-up and operating mechanism together with the hardware components and devices involved.

the integration of parallel processing to the method provides the experimental evidences in the light of performance comparison and graphical findings showing how the efficiency gain in terms of sudden responsiveness can be improved utilizing the parallel processing capability of many CPUs. Finally, the article wraps up with a Conclusion claiming parallel implementation to have an incremental speed increase over serial method with the growing number of sensor nodes in the network.

1.1.Wireless Sensor Network Architecture

Using Mesh Topology Wireless mesh networks operate like normal wireless networks, but with several convincing distinctions. Mesh networks does not offer a centralized infrastructure rather tries to maintain a decentral network by having each sensor node performs multiple functions, as a user and a router of data traffic[3]. This manner, the network lives as a self-organized and self-managed biological organism capable of delivering service to a huge number of users. Mesh networks usually depend on wireless nodes rather than centralized access points to build a virtual wireless backbone. Network "sensor nodes" create network connections with surrounding nodes, allowing traffic to hop between nodes on various routes across the network.

The wireless sensor network may be built using three structures—

- Layered according to hop count
- Clustered
- Utilizing mesh topology.

The fundamental architecture includes three main things: sensor nodes in which they gather all the information using different sensors like temperature, humidity, pressure, sound, etc., and they may also conduct computation on the received data and transmit it further in the network[3]. Base nodes: All the processed data is kept here. Cluster nodes: The network may be split into clusters. Each cluster consists of a cluster node which manages data of different sensor nodes present inside the cluster[4].

1.2.Wireless Sensor Mesh Network Preliminaries

A wireless sensor mesh network is a self-healing network. When one node can no longer work, remainder of the nodes may still function and interact with one another, directly or via individual nodes by automatically altering the routes between the nodes. These routes may be self-formed and self-healed depending upon the status of wireless nodes in the network. If a node is active and functioning, it may participate in constructing a route with the assistance of another node. Thus, a wireless network may have numerous links. Wireless mesh networks may operate with various wireless technologies like 802.11, 802.16, 02.16, cellular technologies, WiFi, Bluetooth, radio frequency, etc. In addition, need not be limited to any one technology or protocol. The wireless mesh network may potentially have several radios running at various frequencies to link the nodes in the network. Sensor node: The sensor node gathers all relevant information, if necessary, processing the data may also be done on the sensor nodes itself before sending the data further in the network (Figure 1) [5].

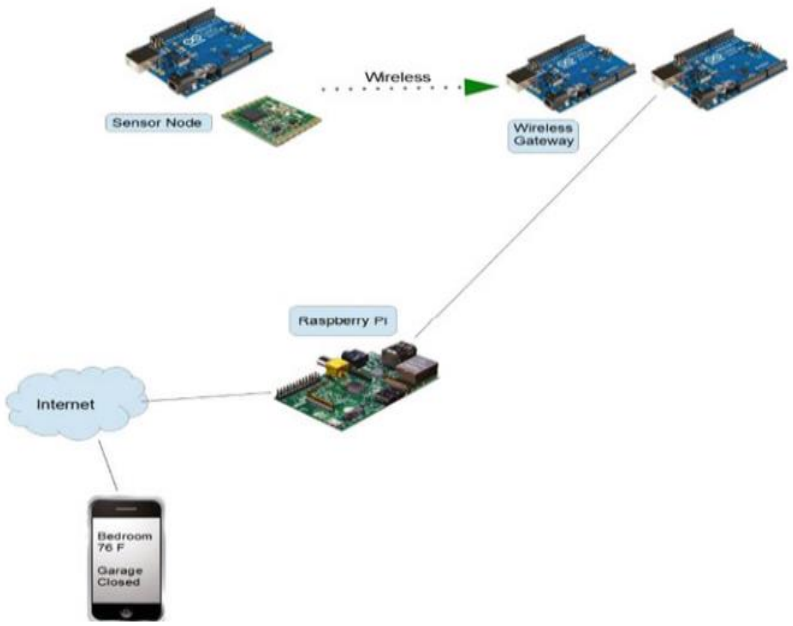

Figure 1: Flow of Data from Sensors with The Help of Raspberry in The Routes of Wireless Gateways

- **Multiple Sensor Node:**

  The network comprises of numerous sensor nodes which cooperate with one another, share valuable network information with one another to keep the network up and operating all the time.

- **Parent/Base Node:**

The gathered data is passed over to the base node for storing and processing further. The parent node may also execute actions depending on gathered data, such turning on the lights automatically when motion is detected in a room with home automation system. The parent node is aware of the sensor node from where the data originally came from, so it may transmit the feedback back to the same node. There may also be many parent nodes with in the network. Each parent node is responsible for managing set of sensors, thereby creating a semi-cluster-based mesh network.

A wireless mesh network (WMN) is a communications network made up of radio nodes organized in a mesh topology. It can also be a form of wireless ad hoc network. A mesh refers to rich interconnection among devices or nodes. Wireless mesh networks often consist of mesh clients, mesh routers and gateways[6].

In this context, connected things are generally defined as Smart Objects (SOs) and, thanks to the IoT, dynamically integrated in several scenarios, such as: smart industries applications, smart cities, smart agriculture, smart health, etc. Each application area has specific requirements to be taken into account, thus having implications for the communication technologies to be considered and, possibly, adopted[7]. Moreover, IoT network topologies are generally star- or tree-based, with data collected by groups of sensors and sent to a central collector or border router, in order to guarantee centralized processing. The emerging and constantly evolving IoT applications require more complex network topologies, without a predefined hierarchy but able to dynamically adapt themselves to changing conditions. For this reason, there is a strong academic and industrial interest on the development of hardware and protocols able to support Wireless Mesh Networks (WMNs).

1.3.Parallel Processing in Wireless Sensor Mesh Networks

Using an effective dynamic protocol helps improving the performance of the wireless sensor mesh network. This speed may further be improved by utilizing parallel processing methods. This may be done either by creating clusters of several parent nodes or by spreading the workload across the various cores of parent node for enhanced processing. Processing of multiple buffers was originally implemented by Intel in their I series CPUs[8]. Same approach may be used to wireless sensor mesh networks too. There are various techniques like as hashing or encryption, which are applied to stream of data buffers[9]. Since the data being processed is extremely big, there is an ever-growing demand for improving the performance.

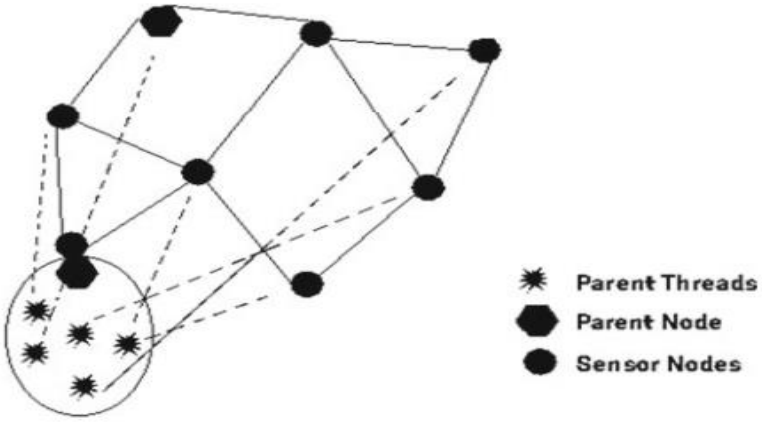

Figure 2: Sensor Nodes Sending the Data to Parent Nodes with Threads Along with Parent Nodes and Threads as well as Sensor Nodes

Two fundamental methods to accomplish this is to process several separate buffers in parallel or to process the buffers using SIMD instructions[10]. Processing in parallel manner helps lowering data dependence limitations. In Figure 2, the sensor nodes may transmit data to the parent node, which includes many threads, i.e. several instances of parent node are present indirectly to process the data. More are the number of threads available on the parent side, quicker the data can be processed; therefore the interval specified in the sensor nodes for transmitting information may be reduced significantly, for more accurate data recording and storage. Further advantages include improved reaction time in case of providing feedback to the appropriate sensor nodes for any action-related signals.

2. DISCUSSION

The functions for reading and data processing activities are divided across the many CPU cores utilizing the OpenMP programming standard. For our study, the inputs are the temperature and humidity concentration data from three distinct sensor nodes, one base station. Using parallel processing, several instances handle the nodes in a parallel manner for processing and response. It is comparable to having a personal thread for every sensor node. The execution timing is significantly reduced down for the parallel implementation of the method employed which is needed by real-time applications to offer immediate responses and output to the end users.

the temperature log for the data received from sensors read paralleled. Here a thread corresponds to each sensor node and is responsible for collecting the values from that corresponding node. Parallel processing creates a difference when collection of data, forwarding and response is done by several threads. An important point to notice about the technique is that when parallel processing is performed, the improvement in performance was significant as the payloads were being queued on the SOCs. The messages are not forwarded until preceding messages have successfully reached the destination and processed by it.

3. CONCLUSION

The article offers a simultaneous data buffering and reading method for situations requiring high number of sensor nodes. With the tremendously increasing data, in order to provide quick

spontaneity to the user inquiry via web, we need certain specific methods to display the results in real time. In this article, we have developed an IoT-based application for reading temperature and humidity concentration data of a particular location. By increasing the number of sensors in order to expand the coverage area slows down the pace at which the result is generated since each node interacts with every other node in the network as well as sends the results to the cluster head or parent node. This data retrieval and processing rate is improved by utilizing the OpenMP programming paradigm by translating the data reading and buffering operations to parallel architecture of the machine having multiple CPUs.

The article also covers in depth the experimental set-up along with the component description and connection. Graphical findings and the comparison table in the preceding section clearly show that the parallel version offers a high-speedup advantage over the serial one. As the number of nodes in the network grows, the performance benefit likewise increases. Further research may be done using the same idea of many parent nodes for a cluster-based computing environment as single machine meets to a specific restriction at some instance. The high use of the RF modules leads in heating up of the modules in case of extended operation, which impacts the performance and speedup a little. Instead of software implementation of data encryption, if the SOC is built in a manner such that the encryption is done on board, the speed may be improved further.

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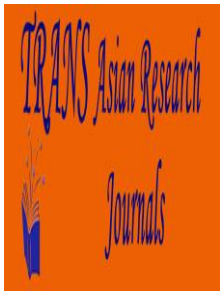

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THE ROLE OF ZOONYMS IN THE EXPRESSION OF AXIOLOGICAL CONTENT

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ABSTRACT

In the study, the anthropozoomorphism of zoonyms was analyzed through proverbs. They have been used to express both positive and negative meanings in proverbs, and in some places for both negative and positive evaluation relationships depending on the content of the text. In lingvoculturological and axiological studies of the Uzbek language, zoonyms have a specific semantic value. Language owners make extensive use of zoonyms when evaluating events or people in proverbs. Images and symbols are created through the skillful use of methods of comparison, comparison and contrast of knowledge.

KEYWORDS: *Axiology, Zoonym, Zoomorphism, Anthropozoomorphism, Value, Evaluation, Subjective Evaluation, Language, Axiological Vocabulary, Paremia, Proverb.*

INTRODUCTION

In lingvoculturological and axiological studies of the Uzbek language, zoonyms have a specific semantic value. Language owners make extensive use of zoonyms when evaluating events or people in proverbs. Images and symbols are created through the skillful use of methods of comparison, comparison and contrast of knowledge.

LITERATURE ANALYSIS AND METHODOLOGY

In Uzbek linguistics, a number of studies have been conducted covering functional-semantic, morphological features of zoonyms, their use in speech, structural and semantic,

lingvoculturological features of zoonymic component parema and phraseological units [1,2,3,4,5].

Zoonyms are studied in the language under the terms zoonyms, zoomorphisms, animalisms, zoosemisms, zoometaphores, faunonyms, anthropozoomorphisms. “Anthropozoomorphisms are metaphors that describe man. The term zoomorphism is understood in philosophy and archeology as the depiction of gods in human form and has been used in linguistics in the study of zoometaphores” [6, p.29]. Also, “biomorphic codes are linguistic units that reflect human perceptions of the animal or plant world: cunning as a fox, a young lion; zoomorphic metaphor - words used in a metaphorical sense, denoting animals and birds: buffalo, lamb (in the sense of a child)” [7, p.22-23].

RESULTS

In the study, the anthropozoomorphism of zoonyms was analyzed through proverbs. They have been used to express both positive and negative meanings in proverbs, and in some places for both negative and positive evaluation relationships depending on the content of the text. In particular, the horse zoonym plays an important role in the assessment of human behavior, physical and mental capabilities in proverbs.

Positive assessment:

In proverbs such as *Отнинг ўлими – итнинг байрами*; *От қариса – охурда, ит қариса – чуқурда*the horse zoonym as an anthropozoomorphism has always valued people who have been brave and have done good to others. In the text, the zoonyms of horse and dog are used appropriately to show the people's attitude to the virtues and vices in man. Spoken antonyms such as ax-pit indicate that in the linguistic landscape of the language-possessors, the ax-lexeme is embodied in the sense of prestige, while the profound lexeme is embodied in the negative evaluation semantics (*бировга чуқур қазима, бир кун ўзинг йиқиласан*). The text O*т топади, эшак ейди*reflects the value of such qualities as courage, diligence, agility, generosity. *Эшак урган билан от бўлмас*: not being good is defined as a constant rule in proverbs. In the proverb, the horse is described to wise men through anthropozoomorphism.

Negative Assessment:

От ойлигин ўйлар, туя йиллигин; от миниб яқинни кўзлагунча, туя миниб узоқни кўзла thise proverbs describe people who think of today, not tomorrow. *Отни ит қайтарар*. It is well known that dog anthropozoomorphism is often described as bad – greedy, hypocritical people. The text states that a horse is sometimes a victim of such people because of the simplicity of good people. *Шернинг ўлиги ҳам от ҳуркитар*this proverb evaluates cowards.

Proverbs about horses are prone to error and sin: *От айланиб қозиғин топар, сув айланиб ёриғин; От босмайман деган ерини уч босар*. *От чачаси узунлиги – ўзига зарар* the proverb states that man's physical and mental superiority over others sometimes harms rather than benefits. “Chacha - is hair that grows from the top of a horse's hooves. Normally, strong, strong horses have long hair and can be overwhelmed and fall while walking” [8, p.213]. Language owners were able to create rules for themselves as a result of observing the natural movements of animals. *Булбул овозининг хушлигидан – қафасга гирифтор –* the proverb is also used in the same sense.

As anthropozoomorphism in horse zoonomic proverbs, the socio-economic opportunities of the individual, such as career, wealth, prestige, and their various effects on human life are also observed: *От ўлади, қуш учади; От минган отасини танимас, Той минган – оғасини; От минмаган от минса, чопа-чопа ўлдирар, Тўн киймаган тўн кийса, қоқа-қоқа тўздирар.*

Our people say, “От - мурод”. At the heart of the horse's will is a universal meaning [9, p.5]. The name of the horse in the proverbs also shows its value in the life of the people.

In addition to conveying certain information to the listener, the speaker also aims to have an emotional-expressive effect on him. Hence, the content of the character often reflects the modal attitude of the speaker.

The wolf - is the totem of the Turkic peoples, it is a symbol of courage and disobedience. Legend has it that the basis of Turkish tribes was tied to the wolf, which led to the preservation of their trust in the wolf. The main part of the trust in the wolf is associated with the birth of a child in different groups of Uzbeks, saving his life. In the Kashkadarya Uzbeks' bells, avahli, nayman, kuchchi, saroy, and mangit, pregnant women carry tumors from the wolf's skin, bones, and other organs. those who missed [10, p.68-69]. All this is a symbol of the attitude of the Turkic peoples to the wolf, and at the same time means to find prey like a wolf. It is no coincidence that the phrase "seen by a wolf" is not used for the lucky and successful people. Hence, the wolf zoonimi was a leader in totemistic views, describing a disobedient, courageous, resourceful man.

In the proverbs, the wolf zoonymy was observed to be actively involved in the process of evaluating ruthless, greedy people along with brave, disobedient people. Below we analyze its anthropozoomorphic properties:

Neutral assessment:

Бетда юрган бўриман, Насибамдан кўраман.The text describes the relationship between man and destiny, fate with the wolf zoononym.

Positive assessment:

In the proverb “*Бир бўри ўлжа топса, Ўн бўри ҳозир бўлар”* the custom of sharing the prey of the wolf with others is passed on to people, and the value of friendship and harmony is realized. *Бўри ҳамсоясига ола қарамас* as a continuation of a previous proverb about looking at a neighbor. People who are loyal to their brothers and sisters are valued by the people when “*Бўри бўрини ёрмасда*”. *Бўрининг озиғи – бурнида*.This proverb reflects the value of such qualities as proportion, availability of food, diligence, agility, appropriate to human action. In the text of *Ит еганидан бўри егани яхши*, *Бўри ориқлигини билдирмас* qualities are given to brave, courageous and frankly persons.Given that the Turkic peoples are a symbol of courage, disobedience, it can be said that the text expressed intellectual and moral qualities.

Negative assessment:

Лақмалик – Бир тулки етти бўрини етаклайди: пасткаш, ўз манфаати йўлида ҳар қандай ёмонликка тайёр: *Бўри бўронда қутурар; очкўз – Бўрининг ўзи тўйса ҳам кўзи тўймас*; ёвуз, кучли: *Бўри қариса ҳам битта қўйга кучи етар;* тавқи лаънат - халқ нафратига дучор бўлган киши: *Бўрининг еса ҳам, емаса ҳам оғзи қон;* бағри тош, золим: *Қўй билан бўри бир оғилда яшамас*; мавқеи баланд, амалдор: *Қўй қарғиши бўрига ўтмас* and so on. The proverb, *Бўридан қўрққан овга чиқмас, Илондан қўрққан сувга тушмас*, refers to the difficulties and hardships of life.

Greedy as a dog, stupid as a donkey, fat as a pig, and so on can be displayed. It can be observed that in different lingvocultures a certain thing is used, for example, an animal as a standard of constant imitation. For example, in most languages, the fox is actively used as a symbol of deceit, deception, deceit, as a standard: cunning as a fox, хитрий как лиса (Russian). Or as a peculiar analogy of the Uzbek language, soft as a sheep, thin as a ghost, eats like a mold, works like a dog,

These analogy standards also take an active part in the process of evaluation of the national worldview, the comparison of world events according to national perceptions, formed as a result of comparison.

Because man understands the world and himself through language based on universal and national experience. At this point, the national experience determines the specific features of the language at all levels. Because of the specificity of language, the linguistic landscape of a particular world is depicted in the mind of the language owner, and man sees the world through it.

The proverbs reflect the value of men and fathers in the anthropozoomorphism of camels: *Бақироқ туянинг бори яхши, Бақириб тургани ундан ҳам яхши.* Features such as the size of the camel, making it long and light, were the basis for describing the father – male; paternity:paternity responsibility:*Туя қанча - яраси шунча*; кучли: *Душманинг куя бўлса ҳам туя бил; Йиқилсанг ҳам туядан йиқил, Биров сенга кулмасин*; humble: *Кичкина юкка туя тиз чўкар*; senior, official (positive): Тайлоқни тайлоқ дема, Тайлоқ туя бўлар; enthusiastic, courageous people: Туя - катта, Яғрини – ундан ҳам катта such proverbs are positively expressed.

Туя чўкса, жой олар – инжиқ, Туя элакка қолганда бўкирибди –without will, *Туяга қанот битса, томингни бузар* –enslaved to lust, *Туяни ўйна десанг, Ҳамма ёқни пайҳон қилар* – stupid, foolish,*Туядан катта фил бор* – proud*Туяни чўмич билан суғориб бўлмас*–haughtya negative assessment was made in this proverbs.

Duck zoonymy has also been used in proverbs and sayings to describe human beings and to assess human defects. “*Ўрдакдай сувдан қуруқ чиқади*” – sly, “*Ўрдак мижоз*” – provocateur, “*Дунёни сув босса ўрдакка не ғам*” - selfish, “Шошган ўрдак ҳам боши билан, ҳам думи билан шўнғир” - hurried, the situation is described figuratively.

The goose has been involved in both aesthetic and ethical evaluation processes as a stereotypical image. “In Uzbek folklore, the images of geese and ducks are often used side by side. In such places, they become antonymous symbols with opposite poetic meanings ”[11, p.23]. For example, in the proverbs “*Ўрдак бўлмай ғоз бўл, билим олиб соз бўл”, “Қарға учиб ғоз бўлмас, бошлиқсиз уй соз*”, a goose appears as a positive image. So, while the duck is a symbol of ugliness in the process of perceiving beauty, in the proverb “Қўшнининг товуғи ғоз кўринар, келинчаги қиз” the goose reflects beauty in an aesthetic assessment.

The concept of“bad person”is also expressed in zoonyms:

Ит енгганини талар → act according to his ability, who can correctly assess the situation in the way of his negative goal;

Ит билан ўйнашиб бўлмас, кучук билан – ўйлашиб. "Кучук билан ўйлашиш" suggests that an adult should be consulted. At the same time, the "big" sema of the dog lexeme and the "small" sema of the dog lexeme are entering the opposition.

Ит итлигини қиларда - it is said that no good can be expected from a man of bad character. *Итнинг иши – узмоқ, ёмоннинг иши- бузмоқ, Куннинг ёмони кетар, одамнинг ёмони кетмас; Ёмон одам тўймас; Ёмонлигини қўймас*. The same content is expressed in proverbs that do not leave evil.

If we pay attention to the meaning of the proverbs, it is common to look at a dog when evaluating greedy and lowly people: *Дарё тўла сув бўлса ҳам, ит тили билан сув ичар, Ит туққанини танимас, Итдан суяк кутма*–the proverbs evaluated stingy and stingy people. *Ит иззатини билмас, эшак – тарбиятни*– in the proverb of upbringing the dog refers to inferiority, the donkey – to stupidity. Evil people who do not know good are likened to donkeys: *Эшак сийпаганни билмас, ёмон – сийлаганни.*

CONCLUSION

In conclusion, it can be said that zoonyms are one of the main linguistic units in the expression of axiological content. These proverbs contain such moral values as "Good - Evil", "Mercy - Cruelty", "Loyalty-Betrayal", "Humility-Arrogance", "Wisdom - Stupidity", "Beauty – Evil", which serve as the basis of human axiological characteristics found its expression.

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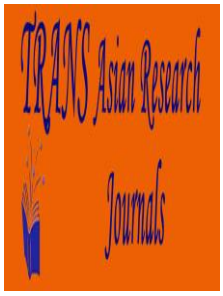

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IMPLICIT COGNITIVE STRATEGY EXPRESSION IN ENGLISH AND UZBEK LINGUOCULTURE

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ABSTRACT

This article considers the expression of implicit cognitive strategy in English and Uzbek linguo-culture. Communicative strategies are analyzed in terms of "position" into different components, namely neutral strategy and cooperative strategy. The article also focuses on the essence of the manipulation strategy, with examples in English and Uzbek.

KEYWORDS: *Neutral Strategy, Cooperative Strategy, Manipulation Strategy, Speech Tactics, Extra-Linguistic Tools, Addressee, Addressee, Communication.*

INTRODUCTION

Communicative strategy is also inextricably linked with psychological processes. This strategy is considered a "dialogue debate" in psychology. In this case, the addressee includes actions aimed at weakening the position of the addresser by demonstrating his superiority over the opponent (interlocutor), holding his position, exerting pressure. J. Lakoff and M. Johnson analyze the concept of "struggle" using the metaphor "Debate is war" in their book "Metaphors we live by". The authors emphasized that, we value the person we are arguing with as a competitor and attack his or her position in order to defend our position, if we dominate in certain areas, we lose the opportunity in some process, and we develop strategies to achieve superiority. If we are not confident in defending our position, we will attack again by choosing a new direction. The behaviors we use in the process of arguing will be partly linked to the concept of "war / struggle" [Lakoff, Johnson: 127-128]. J. Lakoff and M. Johnsons emphasize that family quarrels or disputes based on certain customs are carried out within the concept of war / struggle. Therefore, these concepts are considered to belong to the cultural conceptual structure of the society in which we live. Apparently, the debate, the conflict, and the controversy has a conceptual character, in which the addressee, by any means, aims to defend his position, to put pressure, and ultimately to win. This goal is carried out through the use of specific strategies, in particular through the formation of a communicative strategy. Communicative strategies are formed based on the communication purpose, communication process, interlocutor's character, the situation of communication. These strategies can be divided into different components in terms of "position":

1) neutral strategy is characterized by one of the participants (or each) does not pay attention to the attitude of the interlocutor, avoids communication with the person, which can cause communicative inconvenience. Neutral strategy is implemented in different forms, depending on social, national and cultural characteristics. V. S. Dudchengo considers these strategic actions as “an escape strategy (avoidance strategy)” [Dudchenko 2001: 46]. In this case, it is implied refusing to argue in order to avoid a conflict or dispute, giving the interlocutor a chance to dominate, lack of desire to pursue one's own communicative goals and interests, or using ways to end the communication (debate, argument) more quickly. This strategy is directed to ensure not to provide continuity of communication purposefully; 2) the cooperative strategy is focused on building relationships with the interlocutor. This communication strategy is chosen in relation to the speech situation. In particular, in disputable or controversial situations, the actions of one of the interlocutors performed in relation to alleviate the situation, to change the conflicting situation in a favorable direction for communication, to regulate the situation are implied. The cooperative strategy creates an opportunity of maximum implementation the interests of each of the participants of communication in a peaceful way in a contentious situation. V.S.Dudchenko calls this communication strategy with the term "constructive". In this case, it is implied that the negotiating, resolving the dispute wisely, regulating the dispute, and encouraging the participants to come to the discussion (Dudchenko, 2001; 46). Cooperative strategy is manifested in the behaviour by the participants of the dialogue focused on finding a mutually acceptable solution in a constructive conflict situation. Thus, the mentioned communication strategies embody the behaviors and strategic directions of the interlocutors in the conflict situation of the interpersonal relationship, in the contentious debate. These communication strategies serve to determine the course of communication in directly conflicting and contentious debates. The term manipulation is also widely used in communicative strategy analysis. O. Isseris emphasizes that the manipulation is a strategy of focusing only on one's own interests, ignoring the interests, desires and position of the interlocutor in the process of communication (Isseris, 2002; 152). Typically, the phenomenon of manipulation occurs as a result of looking down on the interlocutor. Such behaviors are reflected in the subject’s pressure on the interlocutor, the transmission of his or her thoughts and opinions.

Typically, the phenomenon of manipulation occurs as a result of looking down on the interlocutor. Such behaviors are reflected in the subject's exerting pressure on the interlocutor, conveying their own opinions and feedback. This strategy is implemented through a number of speech tactics, such as the use of deception, the presence of a tone of disregard in the speech units used. Let's pay attention to the following examples:

Imam. "Where are you, son?"

- Taksir, I am from Tashkent.

"What are you doing here?"

- I studied at a madrasah, and now, because it is a holiday, I decided to go to work to earn some money.

- In which madrasah did you study, who is your teacher?

(I was arrested. There are many madrassas in Tashkent, many teachers.)

The teacher laughed:

- Ha-ha, say I am a mullah, not a classroom, say I was educated in a bear house (G.Gulom, 192).

In this example, to the tactics of false information speech used by the subject "I was studying in a madrasah, and now it's vacation time, I chose to travel to work as a laborer in order to earn some money (Ўзим мадрасада ўқир эдим, ҳозир таътил вақти бўлгани учун бироз пул топиш мақсадида мардикор ишлаш учун сафарни ихтиёр қилган эдим)", to the question given by the imam "Which madrasah did you study in, who is your teacher? (Қайси мадрасада ўқир эдинг, мударрисинг ким?)" the answer “Sir, in that great madrasah, our teacher will also be that great teacher (Тақсир, ўша катта мадраса-да, домламиз ҳам ўша катта домла бўладилар)” can be an example of manipulation. Manipulation also implies that the participants in the conversation ignore the thoughts and comments of the interlocutor or are unable to understand the interlocutor’s opinion. The interlocutor (the naughty child) does not have the ability to comprehend the comment in this fragment "Ha-ha, say I am a mullah, say that I was educated in a lust-room, not a classroom (*Ҳа-ҳа, муллаваччаман дегин, дарсхона эмас, хирсхонада таълим олганман, дегин*)". The speech tactic used by him aimed at implementing the strategy of “purpose of finding a place or to spend the night” in any way. Communicative tactics can be applied directly or indirectly in the implementation of a particular strategy by interlocutors. Interlocutors use different communicative tactics in terms of the communication situation, the communication process, depending on the purpose of the communication strategy.

The "manipulation" proposed by E. Malyaga and B. Tomalin is related to the content of the communication and is implied to link the communication strategy to the interlocutor **(Elena N.** Malyuga, Barry Tomalin.,2017; 28-45). The strategy of manipulation is implied primarily to ignore the position of the interlocutor, putting personal interests first. Secondly, manipulation is also used when one communication strategy is superior to another, and is used to control communication. In the process of applying this strategy, the addressee puts the addresser in a lower position than himself. This strategy is manifested in the dominance of the communication process like this, the conduct of one's own opinion, the management of the communication process, indifference to the thoughts and attitudes of the interlocutor, the desire to focus on one's social reputation.

- You killed me, boy, you killed me ...

Azizkhan was in a strange situation. He didn't know what to do, he couldn't find a word to comfort her. It would be very cold if a big man was sitting on top of him, and a famous wrestler was crying. Azizkhan was embarrassed to bend such a proud man and darken the world. Whenever he could lift his spirits, he did not hesitate. What to do? Azizkhan put his hand on his shoulder and asked:

- What can I do, Polvon aka, what can I do to please you?

The wrestler stared at him with tears in his eyes.

- There is only one way. Brother John, you don't say no.

Nobody knows you. He does not blame when he confesses. Tomorrow, after Tamarakhonim's concert in Urgench, there will be a fight in the Jura wrestling tournament. I will demand of you. You will fall. Brother John, if you don't do that, I'll beat myself up.

You are close to my childhood. Azizkhan got up angrily. Ash wrestler also stood up.

He tried to keep his mouth shut.

- What can I say? Well ...

He was speechless. Azizkhan came to the bottom of his mouth as he sighed.

- Who do you think I am? I am not one of the nomads you mentioned. If you have the strength, please come on the field and we will compete.

Ash wrestled.

-Brother, at least let's divorce on an equal footing. Say yes.

Azizkhan got married. Ash Polva was in critical condition. If he didn't listen, there would be no harm in doing so. The situation is different. He never tires of slapping himself.

Azizkhan knows the nature of wrestlers very well.

He even heard a lot about those who hanged themselves. Aziz Khan fell from the sixth floor (Said Ahmad 62.)

In these cited examples exactly the manipulation strategy was used, in which the addressee dominates the interlocutor's strategy was observed. Such a strategy is usually observed in differences in the position of the interlocutors as well. Including, it finds its expression in advising, commanding, prohibiting an action, influencing the interlocutor through intimidation, and so on which is carried out in the process of communication between the parents and children, (in Uzbek culture, in the dialogue of older and relatively young people), leader and the employee, teacher and student. Because, implementing of these speech acts allows him in terms of the social status of the addressee. For example:

The old man was leaving me. He came to the door of a ruined house near the cliff.

I stopped in front of the door. He looked behind the old man.

-Yes, why are you cheating?

I was skeptical again.

"Yes!" Said the old man. This is not a birdhouse. Madrasa, madrasa. That's it. This is where illiteracy comes from. Fearing for my life, I leaned in through the low door, darkened by smoke, and entered (G'ofur G'ulom 241).

Opposite manipulation strategies can also occur in the communication process. This strategy is applied in the developing of conflicting situations or at the highest point of the disputed situation. This mainly involves the use of verbal acts such as threats, intimidation when other tactics or strategies do not work. For example:

Ali was talking to his wrestling partner. Suddenly Ash caught sight of the wrestler.

"Have you heard?" What r u doing Haven't you left yet?

"Shall I go to the open grave?" Ash asked.

Ali Polvan immediately noticed what he was wearing. He responded as if he had kicked the dead man.

- Be the bat. This is the day when the wrestler, who is determined to overcome the strength of his opponent, will build.

Ash chewed on the wrestler's breath.

- I believed in you, Ali aka. He knocked me down.

Why didn't you stand up? I thought I would take revenge without them. (Said Ahmad 69.)In some situations, the manipulation strategy can be implemented using multiple tactics. It can be observed that the communication tactics used in these situations are superior to one another and vice versa. In particular, using reprimand tactics, a strategy of conveying the necessary information to the addressee or a strategy of putting pressure on the interlocutor is applied. For example:

"I liked the hand of a cow that was forbidden to me by my uncle Sendai, and they could pay for it anyway." He said, "No, I will not see you again on the Day of Resurrection."

One of the pragmatic means that is the basis for ensuring an effective flow of communication is the method of addressing. Addressing is not only a lexical-pragmatic element of the rules of speech ethics within the framework of a polite strategy, but also a way of managing the communication situation by the addressee. In addressing, it is important to introduce yourself (if you are communicating for the first time), to apologize for the inconvenience, and to show a positive emotional expression by focusing on the personality of the interlocutor. The courtesy formulas, which are part of the etiquette norms, serve to the communicative situation transition of appeal. These politeness strategies are expressed in different linguistic and extralinguistic means according to the social status of the interlocutor, the parameters of the communication situation, national-cultural relations. For example:

'And here,' she [Lady Montdore] said, to the company in general, 'is Montdore.' She always called her husband Montdoreto those she regarded as her equals, but to borderline cases such as the estate agent or Dr. Simpson he was Lord Montdore, if not His Lordship. I never heard her refer to him as ‘my husband’, it was all part of the attitude to life that made her so generally unbeloved, a determination to show people what she considered to be their proper place and keep them in it. [Nancy Mitford “Love in a cold Climate” 2006: 27]

Kosagul was a shy young man, and he noticed that Haji aka's eyes were shining like beads in water.

- There is nothing wrong with asking, Hoji aka. Lest they .....

"Yu-yu-yu!" - Hoji aka shook his head sharply. "We've been around ... We've been around."

"Not much, just a little," said Kosagul with a smile.

Haji aka was in a difficult situation for a moment.

"Kamina was put in a very embarrassing situation ..." he sighed. "Let the devil's neck be cut off until the boy dies!"

"Which one?"

The fireplace will be "red", said Hoji aka modestly (O. Hoshimov, 338)

The communicative strategy of politeness is not limited to certain ways of greeting (*Assalamu alaykum, how are you?* etc.), but the exchange of ideas with the interlocutor is observed in the process of "There is nothing wrong with asking, Haji aka (*Сўраганни айби йўқ, Ҳожи ака).*” When the active involvement of the addresser in the communication is observed in the exchange of ideas, it is worth noting that this "red" one as well satisfies me (Каминага “қизили”ям бўлаверади)” strategy has worked.

Communicative acts of apology perform important social functions of politeness within the communicative strategy. Apologies can eliminate the inconvenience to the addressee and provide making him feel comfortable in the communication process. The implicit method of apologizing is a feature of English culture. This process can be carried out by fully disclosing his guilt by the addressee, explaining the causes and arguments of the events that took place, and giving reasons.

This strategy in the communication process can be used in certain cases when the addressee does not have a high desire to continue communication with the listener. Negative feelings of the addressee, expressing sympathy in situations related to emotional state are carried out using communicative tactics. In addition to the emotional state of the addressee, the focusing on the internal experiences, psycho-emotional state, and careful selection of linguistic units are required in this tactic. It is also important that the linguistic units and expressions that are widely activated in society and the social environment are delicately conveyed to the addressee. This can be observed in events such as expressing condolences. The means of speech expression applied in such realities are, in a sense, also acquires linguocultural significance. In such cases, the use of such expressions in Uzbek linguistics as *"Bandalik", " May Allah have mercy on you ", " May Allah saves his servant"* is more expressive and widely used than the method of *"Accept my condolences* (typical of Western culture)". In English culture, phrases like “Please accept my / our sincere condolences”, “I am so sorry to hear about your loss”, “I would like to express my sincere condolences on the death of…” (http://englishadmin.com/2013/05/expressing-condolence-in-english) can be important. Compare:

Mr. - Mr.Forsyte,” said Bentworth, “we want you as a lawyer to come on this committee and keep us – err – straight ... Just cast your eye over this, will you be so good”[Galswotrhy Swan Song 2003:194]

- Is it okay? He said, frowning as if he were to blame for everything.

-Шукур, -Умри хола култ этиб ютинди.- Ҳозир ухлади (O.Hoshimov, 242).

In order to ensure a certain flow of communication, it is necessary to pay attention to its illocutive power in the application of communicative tactics of advice, encouragement, and gratitude. For example:

- I am in bondage!

The elder of the neighborhood near Iskandar looked at Shakir aka meaninglessly.

"Everybody has a head," sighed the old man. "When our mother was different, she was a heavenly woman." (O. Hoshimov, 260).

In the example of the Uzbek language, the speech units "In slavery, it is in everyone's head (Бандаликда, Ҳамманинг бошида бор)" is one of the communicative tactical means of expression aimed at encouraging the interlocutor, giving spiritual freshness, are units specific to national culture which usually used in condolence ceremonies.

In this case, the expression of gratitude is manifested in the use of short means of expression, the use of nonverbal methods, the conviction that there is a sense of gratitude for the service performed.

Communicative strategy is one of the means used by any social activity to solve a particular and specific problem. Speech is a way of organizing behavioral actions according to the purpose of

communication. In a broad sense, communicative strategy is understood to be the greatest task of speech, which is determined by the practical goals of the addressee.

Communicative strategies reflect social models approved by the society. They are interpreted as intermediaries that link a person's level of knowledge (verbal, pragmatic, motivational) in the speech process. The study of the social expression of communicative strategy is carried out based on the theories of linguists in the field of strategy (manipulation, vualization, mystification, anonymity or depersonalization strategy, reformation, delegitimization, discretization, amalgamation strategies).

A wide range of lexical and cognitive techniques (irony, hyperbole, metaphor, allusion, allegory) can be used to apply any strategy and tactics.

The communicative goal is a key component of pragmatic analysis. The effective or ineffective outcome of the goal was considered to be related to the speaker's ability to use language, speech acts, as well as the expressive stylistic and figurative capabilities of the language and the skill of choosing nonverbal aids.

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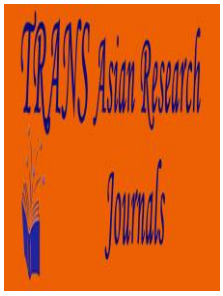

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CONTEMPORARY CALLIGRAPHY ART OF UZBEKISTAN

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ABSTRACT

This article focuses on the development of science, education, culture in the ancient cities of Central Asia, such as Samarkand, Bukhara, Khorezm, Kokand, Tashkent, the history of calligraphy, scientists who worked in this area and contributed to the development of calligraphy. In addition, opinions were expressed on the development of calligraphy in Uzbekistan in recent years, its achievements and problems. Images of architectural monuments of historical importance, decoration of modern buildings and compositions used as examples of calligraphy.

KEYWORDS: *Central Asia, Uzbekistan, Samarkand, Bukhara, Khorezm, Kokand, Tashkent, Calligraphy, Composition, Art, Architectural Monuments.*

"Elegant and beautiful writing is enlightening to the eyeand makes the heart rejoice! "
Ibn Sino

INTRODUCTION

Calligraphy is one of the greatest inventions of mankind. When a person is born, he intends to think, to create, to pass on or leave to others some thought, idea, novelty, and discovery that is born in him[1]. In the course of their historical development, mankind has used various objects in order to store, collect, and exchange information in the form of writing, images. They are: stone, pottery, wood, bone, metal, papyrus, parchment, cloth and paper. Each of these objects at one time, in the country, served for writing, image processing, and over time gave way to another. Each piece of writing required a unique approach and writing style. Calligraphy is one of the unique types of fine arts, which expresses its essence in practical-artistic forms through concrete words between architecture, book art, miniature, folk applied decorative art, various decorative forms of art is the most influential art form in the human psyche from a spiritual and enlightenment point of view.

When talking about the art of calligraphy in Uzbekistan, it is impossible not to mention its historical roots. In particular, in the major cities of Central Asia, such as Samarkand, Bukhara, Khorezm, Kokand, Tashkent, located in the territory of modern Uzbekistan, from ancient times great attention was paid to the development of science, enlightenment and culture.

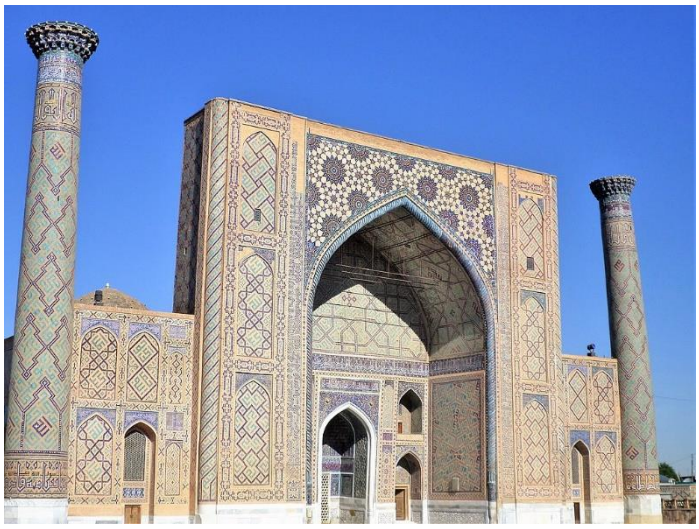
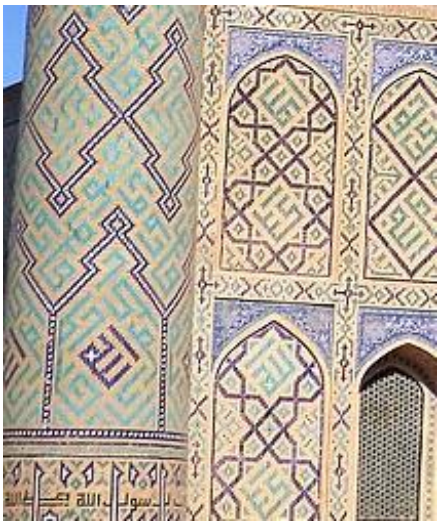
If we look at the history of the development of calligraphy in Central Asia, we can see that in the VII-X centuries the Movarounnahr calligraphy school was established in the central cities of the Arab Caliphate - Mecca, Kufa and Basra, and later spread to other parts of the caliphate. Calligraphers such as Ahmad ibn Umar Ash'as Abu Bakr Samarkandi (XI century), Ahmad Tabibshah Movarounnahri (died 1215), Ali Banokati (XIII century), Jamshid Shoshi (XIV century) became famous as representatives of this school[2].

Among the various branches of science, our ancestors were leaders in the basics of Islam, such as tafsir, hadith, ilmu kalam (philosophy) and Sharia law. The work of such scholars as az-Zamahshari, Imam al-Bukhari, al-Farabi and Burhanuddin al-Margilani Kamoliddin Behzod is invaluable in this regard[3]. In the XIV-XVI centuries, as in all areas of science, culture and art, there was an unprecedented rise in the art of calligraphy. Since that time, several calligraphy schools have sprung up in various parts of Central Asia. In the 15th century, during the Timurid dynasty, Herat, in the 16th century, during the Shaybanid dynasty, Bukhara, then in the early 18th century, Khorezm and Fergana calligraphy schools were formed in Khiva and Kokand khanates, and in the 19th century, Samarkand and Tashkent calligraphy schools. Among their brilliant representatives were Sultanali Mashhadi (1437–1520), Darwish Muhammad Taqi Hirawi (first half of the 15th century), Abduljamil Kotib (died 1505/1506), Mirali Hiravi (died 1557), Mir Ubayd Bukhari (d. 1601).), Mir Hussein Kulanki Bukhari (XVI century), Sayyid Abdullah Bukhari (died 1647), Haji Yodgor (died 1663), Ahmad Donish (1826–1897), Munis Khorezmi (1778–1829), Kamil Khorezmi (1825–1899), Mirzo Sharif Dabir (19th century), Muqimi (1850–1903), Ochildimurod Miri Kattakurgani (1830–1899), Abduljabbor Urguti Samarkandi (1885–1910), Muhammad Yunus Kotib (19th century), Muhammad Shahmurod Kotib (1850–1922).

In Uzbekistan, from the first years of independence, a wide path has been opened for the spiritual and enlightenment development of the people, the restoration of national values. Today, much attention is paid to the study of languages such as Arabic and Persian, which are the key to the study of cultural heritage, and the old Uzbek script based on Arabic spelling. After all, modern students, especially future professionals, need to know how to read and understand the text in manuscripts in order to know and understand the history, language, reason of their people. The reason is that today in various museums and libraries of Uzbekistan there are various manuscripts and documents of historical significance that have not yet been studied. Examples include the Manuscripts Fund of the Abu Rayhan Al Beruni Institute of Oriental Studies, the Alisher Navoi National Library of Uzbekistan, the Central Library of Islamic Civilization, the State Museum of History of Uzbekistan, the State Museum of Timurid History, the Kamoliddin Behzod Oriental Miniature Museum, Samarkand State University and others. We can cite thousands of manuscripts stored in many museums, libraries and private collections in our republic. Manuscripts are being studied not only by their historical significance, but also by scholars as a source for the art of calligraphy.

Our ancestors used calligraphy in all aspects of architecture and folk arts. In particular, they decorated the interior and exterior of the buildings with inscriptions of wise words. The activity of any building or institution is understood from the decorations in its appearance. For example,

in the exterior decoration of places of knowledge and enlightenment there are wise words and hadiths that promote knowledge and spirituality, in caravanserais and teahouses there are call for mercy,verses of hadith from the Qur'an that calling for worshipin mosques, prayers and remembrances in mausoleums and shrines. For example: Registan ensemble in Samarkand— one of the architectural complexes in Samarkand's Registan Square, consisting of 3 Madrasas (Ulugbek Madrassah (Fig.1), Tillakori Madrassah, Sherdor Madrassah), is inscribed on the wall inscriptions of Ulugbek Madrassah. “Education and learning will bring honor in this world and a position in the hereafter"reflected in the inscriptions, we can see that the exterior decorations of the building are embossed and consist of inscriptions expressing different meanings.

1   2

(Figure 1,2) Uzbekistan. Samarkand. Ulugbek Madrassah (1417 - 1420)

In Shakhrisabz, on the walls of the White Palace built by Amir Temur (Fig. 3): on the right side of the building "Let the state (our policy) be a guiding beacon", on the left "Let our eternal kingdom be an example to all in creativity and generosity" reflective words are written.

3   4

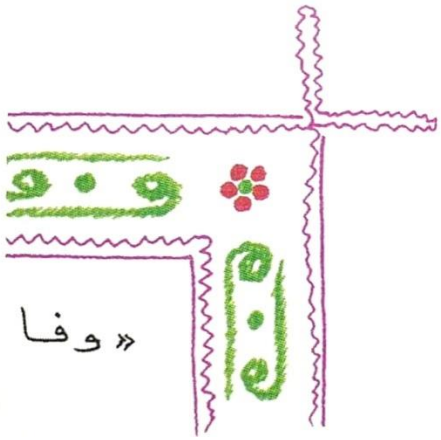
(Figure 3) The White Palace is a memorial in Shakhrisabz. Built by Amir Temur. (Figure 4) Words written on the tower floor on either side of the White House.

Today we can observe the development of calligraphy in Uzbekistan in several ways. The first example of this can be seen in the decoration of book art and miniature works, in which

applied art enriches each other in content and harmony with such art forms as pottery, wood carving, painting, carpet weaving, ceramics. The second is in the work of artists and calligraphers in traditional and non-traditional directions, based on independent compositional solutions as an art form. Thirdly, we can observe that the memorials being reconstructed in the republic and the newly built mosques used as traditional and non-traditional decorations in the interior and exterior.

The Uzbek calligrapher KhabibullaSalihov discovered that the Uzbek national atlas fabric, suzanies, embroidery and ceramics were decorated with words that warn the consumer about the hereafter, call for enlightenment, lift the mood and spiritual.This means that in our country we can see architectural monuments, suzana, embroidery, pottery or book art, all of which are texts that call for knowledge and enlightenment. While Kufi and Suls types of writing were widely used in architecture, folk applied art had its own letters of calligraphy in embroidery, weaving, painting, and methods of their application. In embroidery: words such as khuva, ka'ba, kashta, bismillah, olloh (Fig.5). Depending on the type of atlas fabrics, names such as Khan, Shoyi (Fig.6).Words such as Vafo (Fig.7) were written on the men’s belts. These records are written in different ways depending on the material used. In addition, the calligrapher Khabibulla Solikhov noted that the Uzbek national patterns are based on inscriptions. He created an alphabet of letters according to the patterns and named this type of letter "Khatti Zuhruf Habibi" or "Khatti Habibi". Habibullo Salihov used his own writing patterns in the decoration of a number of memorials and in the art of painting (Fig.8). What distinguishes this pattern from other types of decorative writing is that it creates a decorative image from a combination of beautiful, charming patterns, letters, spells and dots. In this text, regardless of the size of the line, the text can be conveniently written in any size based on patterned glosses. From the written text, the reader not only understands the meaning, but also enjoys it spiritually.

« خان »



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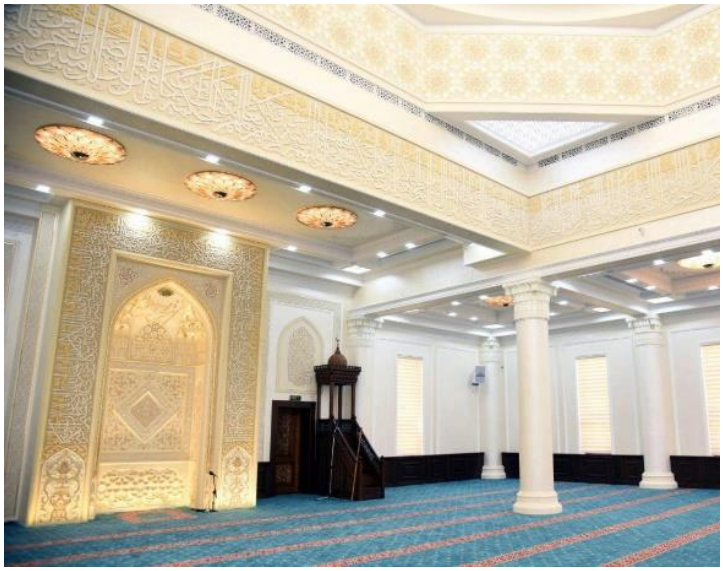
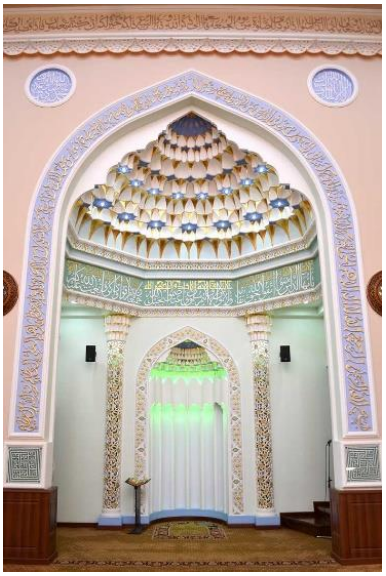
(Figure 5) Khuva, Ka'bah, embroidery, Bismillah, Allah. (Figure 6) In textiles, the satin flower is inscribed "Khan". (Figure 7) The word “Vafo” on the men’s belt. (Figure 7) The Holy Quran (below in the center) written in Hatti Zuhruf Habibi.

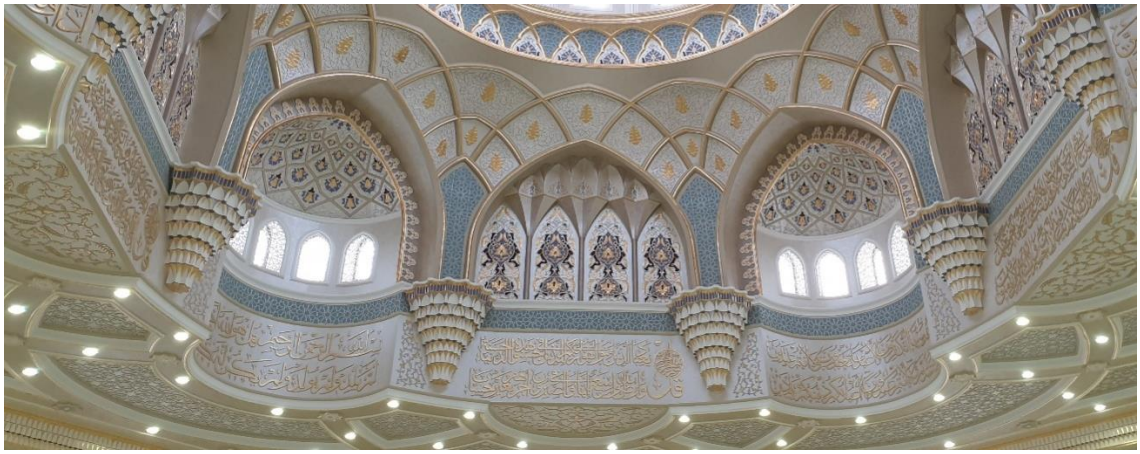
Along with the restoration of architectural monuments in Uzbekistan, the interiors and exteriors of mosques, which are being reconstructed and rebuilt in accordance with modern requirements, are decorated with traditional types of calligraphy. The work of many calligraphers such as Islam Mamatov, Abdugafir Razzokov, Gaforjon Khakberdiev, Salimjon Badalbaev, Abdulla Mirsoatov, Tukhtamurod Zufarov, Alisher Shomuhamedov, Najmiddin Fayozi, Nizomiddin Tursunaliev should be recognized. In the international calligraphy competition held in Istanbul,

Islam Mamatov was in the top ten in 1996 in the style of "Suls" and Habibulla Salihov in 1998 in the style of "Devonian". Habibulla Salihov was awarded the title of "Parvin Number" at the International Calligraphy Competition in Lahore in 1999 for his discovery of a new style of calligraphy, the alphabet of ornamental writing.

Thus, we can observe that the art of calligraphy is widely used in Uzbekistan not only in the art of writing, but also in various fields, in particular, in the fine and applied arts, architecture. Among the mosques built in Tashkent in recent years, we can see the works of our master calligraphers on the outside and inside of the mosques of Sheikh Muhammad Sadiq Muhammad Yusuf (Fig.9), Minor, Hastimom, Sheikh Zayniddin (Fig.10), Siroj Salih (Fig.11,12).

9 

10 

11 

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(Figure 9) The room of the Sheikh Muhammad Sadiq Muhammad Yusuf Mosque in Tashkent. (Figure 10) The mausoleum of the Sheikh Zayniddin Mosque in Tashkent. (Figure 11) Decorations and inscriptions on the dome of the Siroj Salih Mosque in Tashkent. (Figure 12) Frieze inscriptions under the dome of the Siroj Salih Mosque in Tashkent (Surah Al 'Imran, verse 26).

The Association of Artists of the Academy of Arts of Uzbekistan has a branch "Calligraphy" since 1997. Through the attention to the field of calligraphy, in the field of fine and applied arts of art education in the Republic is aimed at preserving our national values, traditions and improving them at the level of modern requirements. For this purpose, one of the urgent tasks is to train highly qualified specialists and increase their professional training. In recent years, the state has been organizing exhibitions and festivals related to the art of calligraphy in order to build the respect of the younger generation for calligraphy and interest to the field. Among them are the personal exhibition of calligrapher Salimjon Badalbaev “Eternity” at the Kamoliddin Behzod Oriental Miniature Museum (2017), Exhibitions of calligraphers at the Egyptian Education Center (2017), Calligraphy Exhibition at the Abulqasim Madrasa in Tashkent (2017, 2016, 2018), exhibition "The Art of Calligraphy" at the Bukhara State Museum-Reserve "Ark" Regional Museum of Local Lore (2019). In Uzbekistan, for the first time in 2018, the Craftsmen's Association held the Calligraphy Festival under the name World of Wisdom[4]. The aim is to spread the work of calligraphers, to introduce them to our people, to support and encourage their creativity.

The science of calligraphy plays a special role in the development, enrichment and further development of national and cultural traditions in the field of creation of artistic compositions in Arabic script in works of art and historical monuments, especially in the research of young artists to find their creative direction. In the system of higher education, the art of calligraphy is also taught as a science in many areas, as well as studied with interest by young people in non-governmental educational institutions, educational centers.

In conclusion, it can be said that the young generation growing up in Uzbekistan, following the example of masters of calligraphy, mastering the existing types of calligraphy, studying the secrets of the field, with their creative work will take their place in the world of calligraphy and raise the honor of our country.

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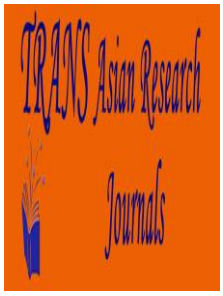

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A REVIEW ON AGENCY EFFECT IN HUMAN COMPUTER INTERACTION

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ABSTRACT

The feeling of directing one's own actions and, via this control, influencing the external environment is defined as agency in cognitive neuroscience. We think that one of the most important factors in how individuals engage with technology is their sense of personal agency. This article relies on cognitive neuroscience theoretical views to present two implicit techniques for investigating personal agency experimentally. We provide the results of two studies in which these techniques were used to HCI issues. One study found that a novel input modality, skin-based interaction, may significantly boost users' feelings of agency. The second shows how changes in the settings of support methods like predictive mouse acceleration may have a big effect on the feeling of agency of users. The approaches offered give designers new tools for assessing and improving empowering interaction strategies and interfaces that give users a natural feeling of control and ownership over their activities.

KEYWORDS: *Cognitive Science, Evaluation Methods, Experience Of Agency, Implicit Measures, Personal Agency.*

1. INTRODUCTION

Designers should aim to build interfaces that "enable an internal center of control," according to the seventh of Shneiderman's Eight Golden Rules of Interface Design. Users "particularly want the feeling that they are in control of the system and that the system reacts to their activities," according to the study. This rule's inclusion in Shneiderman's list shows how crucial a feeling of control is in human-computer interactions. Rotter's early study provided the groundwork for the notion of locus of control. In recent years, a large corpus of research in cognitive neuroscience has focused on the feeling of control, or "Experience of Agency." The feeling of agency is described in this literature as a person's inherent sense of being in control of their acts and, as a result of that control, of being accountable for, or owning, the consequences of those actions.

The feeling of agency may be experimentally examined thanks to methods established by researchers in this area[1]–[3].

We think that people's perceptions of agency, as described in cognitive neuroscience literature, are crucial in how they engage with technology. We look at how implicit metrics for agency experience may be used in HCI research and practice in this article. We provide a short overview of the literature on agency and propose two implicit techniques for investigating it experimentally. Following that, we present two studies that look at the feeling of agency in basic human-computer interactions. The first experiment looks at how changing the input modality of an interaction affects the user's feeling of agency. It contrasts conventional keyboard input to skin or body-based input, demonstrating that input modality has a significant impact on the feeling of agency. The second experiment looks at what occurs when a computer helps people achieve their objectives. The findings of this study indicate that, up to a degree, a computer can help people while maintaining a strong feeling of agency. Users' feeling of agency was significantly diminished after this stage[4]–[6].

This article contributes to the area of HCI in many ways:

- It offers two implicit techniques for assessing a person's feeling of agency.
- It shows how changes in input modalities may have a significant impact on the user's feeling of agency.
- It shows that computer-assisted help may have a substantial impact on a user's feeling of agency.
- It shows how to map the personal agency features of an aided interaction approach using an experimental method.
- It analyzes the consequences of these results and lays forth a research agenda for the future.

In a broader sense, this study shows the advantages of using cognitive neuroscience techniques to get a better understanding of how people engage with technology. As a result, we begin with a quick comparison of different views on agency in the cognitive neuroscience and HCI literature.

1.1. The Feeling of Being in Charge:

Agents are human beings. That is, we have the ability to use our actions to deliberately bring about change in the world. Humans have a conscious experience of this capability as well. This is what it is to have a feeling of control. There is, however, a difference to be made between the reality of directing an action and the immediate feeling or experience of doing so. We can claim, "I accomplished it," because we have had the experience of being agents.

The goal of neurocognitive research on the feeling of agency is to learn more about the mechanisms that underpin this sensation. In general, there are two theoretical perspectives. One perspective looks at the motor system and claims that the feeling of agency is produced by brain processes that initiate and regulate voluntary movement. The feeling of agency, according to this viewpoint, is based on a comparison of the anticipated and actual sensory effects of movement. If there is no disagreement after this comparison, then 'I' am the agent in charge of the specific event. The alternative theoretical viewpoint minimizes the motor system's particular contribution. According to this theory, a more general-purpose cognitive system monitors the connection between ideas (i.e. intents), acts, and their consequences, with the mind inferring and

rebuilding a route between conscious intention and effect. In this case, agency is understood as a reconstructive inference that one's purpose produced an external occurrence.

Much of the fascination in the sense of agency in cognitive neuroscience comes from the fact that it is deteriorated in certain mental and neurological illnesses. The passive phenomenon in schizophrenia is one of the most prominent instances. People here believe that their actions (and occasionally their thoughts and emotions) are controlled by an external force or agency rather than by themselves. According to one patient, "It is my hand and arm that move, and my fingers take up the pen, but I have no control over them." Such accounts reveal a significant disturbance in the processes that promote a feeling of agency, with potentially devastating implications. The feeling of agency, on the other hand, is a very delicate and changeable sensation in each of us. There are times when we have an overabundance of agency. People have been found to make larger wagers when they start a gamble rather than someone else, even though the chances are the same. On the other hand, there are times when we experience a loss of agency, such as when we use facilitated communication, table turning, or Ouija boards. For HCI, this malleability in the human perception of agency presents both possibilities and risks[7]–[11].

1.2. Human-Computer Interaction (HCI) Agency:

In the next sections, we'll propose an implicit metric for assessing human agency. But first, let's have a look at some of the many views on agency that have been explored in past HCI research:

Researchers, in collaboration with partners, have conducted significant study on the 'Media Equation.' People perceive computers as social actors, according to this research, and react to computers and other media in ways that are similar to how they respond to human people. In HCI, one example of an intentional effort to co-opt this reaction as a design resource that engages users and enhances the interaction experience is the development of user interfaces that incorporate embodied agents pictures or animated figures.

Intelligent agents/interfaces: components of intelligent user interfaces often exhibit autonomous behaviour in HCI settings. These systems make use of machine learning and other AI methods to either assist or act on behalf of users. The second experiment described in this article is about such systems, which have the potential to blur the lines between human and machine action.

Semiotic studies of user interfaces consider the created product to be a text, which consumers interpret as a message from the creator. The identification of a design stance, in which the designer as an agent is acknowledged to have had a specific purpose in the presentation of the product, is required for this concept of the interface as the 'designer's deputy.'

The status of machines in laboratories as either neutral instruments or objects of human observation draws attention to the way in which they have characteristics ascribed to them through their participation in social processes of knowledge production and interpretation in science and technology studies. In scientific settings, Suchman has drawn rich links between the agency of robots and software agents, as well as the political and philosophical implications of artificial intelligence, robotics, and HCI.

It's essential to note here that the ideas addressed in this article vary significantly from those studied in previous HCI research. The Media Equation, for example, investigates how people react to computer and media agents, or how they ascribe attributes to them. We do not concentrate on attributions of agency to other persons or objects in this article. Instead, we

provide a fresh viewpoint on how individuals perceive their own sense of personal agency while engaging with technology, which is complimentary to the ones mentioned above.

1.3. Intentional Binding as an Agency Effect in Micro Interactions:

Another large body of research on agency effects has shown that the perceived timing of basic perceptual events is influenced by whether study participants ascribe agency to the source of an observed action. In a nutshell, when we observe ourselves or other individuals, our perceptual experiences vary somewhat from when we witness unintentional occurrences. When an event is seen as an intentional activity, one manifestation of the agency effect is a perceptual shift that delays awareness of the event relative to its real time.

A perceptual shift that predicts awareness of an event that is believed to be the result of deliberate activity is a second manifestation of the agency effect. When a button is pressed and an audible tone is heard, the perceived time of the button push is delayed, but the tone's timing is recorded as happening earlier. These similar effects may also be seen when research participants watch someone else push the button. These two effects have been referred to as "intentional binding" or "temporal binding" when combined. The term "temporal binding" refers to how the action and the following tone are connected in such a manner that the apparent time between them is reduced. The term "intentional binding" refers to the fact that the impact is dependent on whether the action is regarded as deliberate or agent-initiated, rather than being simply physical.

The concept of intentional binding is simple: Human perception of other agents' purposeful actions is based on neurocognitive processes that vary from those employed to perceive nonintentional events, and these processes result in tiny but significant variations in time perception. In other words, different brain circuits (mirror-neurons) have been tuned to fire when we act or when we see another agent acting in a similar manner.

Furthermore, research shows that mirror neurons are not exclusive to macaque monkeys; humans have them as well, and they seem to function similarly across species. To put it another way, we observe and comprehend others by using part of the same brain circuitry we use to do similar activities ourselves. These different brain mechanisms seem to be at the root of small variations in the perceived timing of perceptual events in tightly controlled experimental tasks. Environmental events seen as deliberate actions by other agents are processed differently than nonintentional occurrences, just as environmental noises and language are processed differently in various regions of the brain. This hypothesis has evolutionary validity since creatures benefit greatly from specialized brain circuitry dedicated to detecting the activities of other agents, whether conspecific, predator, or prey.

Previous research on purposeful binding, on the other hand, has shown how it affects human perception in physical settings where individuals see their own or others' voluntary or involuntary motions. When participants watch objects or even their own fingers when their movements are under involuntary external control, the subjective timing between intentional voluntary actions and their effects is consistently reduced. This effect is not observed when participants watch objects or even their own fingers when their movements are under involuntary external control.

Although research by social psychologists suggests that people credit computers with agency, it's uncertain if we'll observe the subtle perceptual impacts of purposeful binding when events and consequences are portrayed in virtual desktop settings common in HCI. Although virtual

environments may seem to be similar to real surroundings, it cannot be expected that the neurocognitive processes that have developed through millions of years in physical contexts would react in the same manner in virtual environments.

Three research are presented in this section that investigate whether agency effects seen in physical settings also exist in virtual desktop environments used in HCI. Each research focuses on a different aspect of the impact of agency on the perception of very basic click–response interactions. To differentiate them from the more complicated and temporally prolonged macro-interactions seen in media equation research, these basic interactions are referred to as micro-interactions.

2. DISCUSSION

Even basic acts and consequences are seen differently by humans depending on agency signals. Given the importance and pervasiveness of HCI, it would seem prudent to investigate the impact of agency effects on software use and user experience. Furthermore, the fact that agency effects may be seen in macro-interactive social behaviors indicates that agency effects can be seen in a variety of settings. However, agency effects in micro interactive settings (i.e., purposeful binding) cannot be expected to be linked to macro-interactive equivalents (i.e., media equation effects) in straightforward ways. Even within micro-interactive settings, there are significant variations in the way agency effects operate, as shown by the distinctions between physical and virtual impacts.

The research presented in this article suggests that agency effects are susceptible to strong learning effects that, while maintaining a connection between perception and behavior, substantially change how agency effects are represented in online settings. Furthermore, if the reversal of timing mistakes in physical and virtual contact can be learnt, additional temporal aspects of subjective experience may be adjusted to achieve desired results. A number of recent studies, for example, have shown that extremely short gaps of 50 milliseconds or less between human action and computer response may be too rapid to be "pleasant," with research subjects preferring longer periods of 100 to 200 milliseconds. However, there are times when delaying computer response for the sake of comfort may cause difficulties.

Gamers may define comfort differently, and a fighter pilot utilizing a heads-up display may be at a disadvantage if a computer's reaction is delayed in the sake of "comfort." However, if training enables individuals to readjust their perceptual experience, there may not be a trade-off between comfort and immediacy. As previously stated, appropriate training may lead to substantial perceptual recalibrations. In other words, the flexibility of perceptual experience seems to imply that agency effects may be acquired in ways that result in the variations seen in the current research. Furthermore, our capacity to change agency effects via learning may have practical implications in time-critical situations where reaction variations of tens of milliseconds can make the difference between success and failure.

Finally, the importance of agency effects in HCI is far wider than the technical emphasis of these research would indicate. Although agency effects such as IB and those described in these research may be regarded as technical byproducts of neurocognitive physiology, evidence that learning may play a role in these effects indicates behavioral and social linkages that need additional investigation. The connection between basic agency cues and elements of social attribution to technology revealed in media equation research is of particular importance in the area of HCI. At this point, linking agency effects expressed in micro-interactions with the macro-

interactive behaviors typical of media equation studies is speculative, but the chasm that has traditionally separated brain and behavior is gradually closing, and there is ample evidence that a genuinely scientific study of how we experience our own and others' agency is within our reach. In addition, current advances in brain–computer interfaces may make mirror neurons, neurophysiology, and neurocognitive processes more accessible and directly useful in understanding or even influencing how humans and computers interact.

Understanding agency effects in HCI will need expanding and expanding current frameworks for linking micro- and macro-interactions, as well as creating a larger foundation of research on agency effects in virtual environments. Studies that include more clearly anthropomorphic elements in basic click response tasks will be a significant step in this approach. All three experiments used basic clocklike interfaces and a minimalist approach to mimicking agency, depending only on pointer movement and click timing to simulate agency. When an experimental activity incorporates an animated agent with anthropomorphic characteristics or click-response tasks are integrated in a more social environment, such as a computer game, people may react very differently to simulated agency circumstances. Studies of anthropomorphism and agency effects are likely to be important in resolving the still-open question of whether the various types of agency effects reported at both micro- and macro levels reflect similar processes at different levels of "granularity" or if they represent distinct processes.

3. CONCLUSION

Finally, one of the most basic sensations we have in our relationships with people and the physical environment is a sense of personal agency. Given the increasing usage of interactive technologies that depend on social signals and reaction, understanding how humans perceive agency in HCI is an issue of great practical importance. The current research clearly demonstrates that agency effects in HCI vary from those in physical settings. As contemporary life grows more virtual, it will be critical to understand how markers of agency, and the social responses they imply, function in HCI.

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A REVIEW ON ATTACK IN WIRELESS AND COMPUTER NETWORKING

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ABSTRACT

The Man-In-The-Middle attack is one of the most widely discussed assaults in computer security, and it is a significant worry for many security experts. The attackers are after the actual data traveling between the endpoints, as well as the data's integrity and confidentiality. Eavesdropping and message alteration via communication interception are two ways that an adversary may undermine confidentiality and integrity. Adversaries may also intercept, alter, or delete communications to prevent one of the parties from communicating, resulting in a breach of availability problem. We provide a comprehensive overview of MITM in this article in order to classify and analyze the extent of MITM assaults. We looked at the OSI reference model as well as two common networking technologies, GSM and UMTS. MITM attacks are categorized depending on a number of factors, including the attacker's location, impersonation methods, and the channel's type. The current countermeasures are examined. MITM attacks are divided into four types in the paper: spoofing-based MITM, TLS/SSL MITM, BGP MITM, and fake base station-based MITM. Finally, we offer preventive methods for all types of assaults, as well as a few research ideas for the future.

KEYWORDS: *Wireless Sensor Networks, Ad-Hoc Network, Wormholes, Network Security, Packet Leash, Tunneling, Suspicious Links, Timeout.*

1. INTRODUCTION

Nowadays, cellphone networks and the internet are used in almost every area of our everyday lives. The use of cellular networks or the internet is required for a few applications such as online home banking, social networking, and online shopping, and so on. Because many internet services entail the transmission of sensitive information about users, they are a prime target for hackers. Hackers attack businesses and organizations, resulting in significant financial losses.

The most effective assault for obtaining control over transmitted sensitive end-user data is called Man-In-The-Middle (MITM). One of the most serious dangers to wireless network security is this.

Victims (the two endpoints) and attackers are involved in a typical MITM attack scenario (a third party). The attacker gains access to the communication channel and manipulates the messages sent back and forth between the two destinations. As a result, in MITM attacks, a malicious third-party attacker may intercept, alter, replace, or modify data sent across the communication channel between the endpoints. Because the victims are ignorant of the invaders, they think the communication route is secure. MITM attacks may be carried out via a variety of communication channels, including GSM, LTE, UMTS, Bluetooth, and Wi-Fi. The attackers are after the actual data traveling between the endpoints, as well as the data's integrity and confidentiality. Eavesdropping and message alteration via communication interception are two ways that an adversary may undermine confidentiality and integrity. Adversaries may also intercept, alter, or delete communications to prevent one of the parties from communicating, resulting in a breach of availability problem[1]–[4].There are four different kinds of MITM attacks. First, spoofing-based MITM attacks, in which the adversary uses a spoofing attack to intercept legal traffic and control the data sent without the hosts being aware of the opponent's presence. In DNS spoofing, the adversary spoofs devices between the end points, while in ARP spoofing, the attacker spoofs these end-points or the victim's devices directly. Second, SSL/TSL MITM attacks, in which the attacker enters the communication channel between the two end points or victims. Adversary creates two distinct SSL connections and uses them to relay messages between them. As a result, the attacker may capture all communications and selectively alter the contents. Finally, BGP MITM attacks, in which the adversary sends stolen traffic to the target. IP hijacking occurs when traffic travels via an adversary's autonomous station, where it is possible for traffic to be altered. Finally, the MITM assault known as the false base station, in which the adversary creates a phony transceiver station and then uses it to influence the victim's traffic[4], [5].

2. SPOOFING BASED MITM ATTACK

An adversary or hostile party impersonates any user or device in the network in a spoofing attack. ARP spoofing, DHCP spoofing, DNS spoofing, and IP spoofing are the four main kinds of spoofing attacks. The next sections look at spoofing-based MITM attacks[6].

2.1. ARP Spoofing:

Attack mechanism: ARP protocols map network addresses to MAC addresses. For LAN communications, ARP is a reliable and essential protocol. Adversaries change the local ARP cache table and link the host's MAC address to the target IP. The purpose of an MITM attack is to obtain access to a user's sensitive information. These ARP spoofing attacks may be split into two categories: cheating the host and fooling the internal network gateway. ARP requests are sent throughout the network whenever a host wants to interact with another computer on the same network with an unknown MAC address. Because there are no appropriate authentication methods, it is simple to manufacture cache entries. By avoiding broadcasts, the source computer may store the IP to the MAC entry to speed up communication in the future. In the caching system, ARP, a stateless protocol, has less security.Defense mechanism: Researchers presented an ARP security surveys and analyzed various schemes for prevention and detection of ARP spoofing attacks. Researchers presented a novel defensive strategy as well as a comparison of

current defense models. Below is a list of existing defensive methods against ARP spoofing attacks[7].

2.2. DNS Spoofing:

Attack mechanism: DNS server is used for URL resolution and is a hierarchical naming scheme used in client-server architecture. Lower level domains, subordinate domains, and higher level domains are organized hierarchically in domain names and DNS servers. DNS spoofing is the most serious attack that takes use of cache placement to enhance speed. There are three main kinds of DNS spoofing attacks. Sniffing or hijacking packets during the query answer process is the first step. Second, cache placement through a birthday attack, and third, illegal DNS hijacking. To do DNS spoofing, the adversary changes the victim's local DNS entry, causing the victim to access rogue servers. DNS renews its cache based on the TTL of records. This is used by the adversary in a DNS spoofing attack. Two techniques are enforced in order to place cache. First, introduce rogue DNS into the network to generate fraudulent data, and then transmit a false DNS response before delivering a genuine DNS response.

2.3. DHCP Spoofing:

Attack mechanism: DHCP protocol is responsible for providing network configuration parameters for new hosts. Subnet mask, DNS server, default gateway, leased time, and IP addresses are among the factors. It has a client-server architecture that allows data packets to be exchanged between DHCP servers and hosts. DHCP has a high security level and is used extensively in network administration. Every DHCP message is sent as plain text, with no authentication of the DHCP message origin. These do not ensure a reliable DHCP server or valid client communication. The adversary conducts a DoS attack or a DHCP starvation assault on the DHCP server. These allocate the DHCP server's IP address pool, preventing new computers from obtaining IP addresses. An attacker may create three types of misconfigurations: incorrect DNS server, incorrect default gateway, and incorrect IP address.Defense mechanism: Researchers presented DNS spoofing solutions to make DHCP even more secure. These are cryptography-based solutions. A second hardware class called DHCP snooping serves as a barrier between trustworthy DHCP servers and untrusted hosts. These prevent DHCP replies from ports that aren't connected to a DHCP server[8], [9].

2.4. IP Spoofing:

Attack mechanism: IP operates at network layer of the OSI reference model. It is in charge of delivering data packets from the source to the destination based on the IP addresses in the packet headers. It specifies packet architectures for encapsulating and delivering data. It specifies addressing methods for labeling datagrams with information about their destination and source. A hostile adversary intercepts lawful parties' communications in an IP spoofing attack. These adversaries have complete control over the communication flow and are able to remove information provided by original parties while remaining unaware of the original endpoints. The different IP spoofing methods that the adversary may use are listed below[10], [11].

- Blind and non-blind spoofing: In non-blind spoofing, the attacker and victim are both on the same subnet, while in blind spoofing, the attacker must first make a request to the network before analyzing the packet transmission sequence. The adversary may spy on sequence as well as acknowledgement numbers via non-blind spoofing.

- ICMP spoofing: IP uses ICMP to deliver one-way communications, as well as to help with problem reporting, testing, and feedback. The ICMP redirect messages inform the router that a better route is available. These messages may be exploited to conduct MITM attacks since ICMP does not ensure authentication.
- TCP sequence prediction: Because TCP is a connection-oriented protocol, a connection link must be established before communication can begin. TCP sequence numbers aid the protocol in detecting out-of-order packets and minimizing data loss, guaranteeing dependability.

The most common IP spoofing defense methods are ingress filtering and IPSec. The following are some examples of IP spoofing solutions:

- Router-based solutions: Distributed packet filtering is a technique for filtering packets based on interface and flow. It looks to see whether the packet has taken an unusual path from its origin to its destination. A packet passport system based on the hash algorithm and symmetric cryptography was presented in.
- Host-based solutions: A reactive system known as stack path identifier was suggested, in which each router's IP field is used to identify packets. It ensures that all packets traveling in the same direction are marked similarly. This ensures that the address is accurate.

2. DISCUSSION

2.1. TSL/SSL MITM ATTACKS:

The encryption technologies Safe Socket Layer (SSL) and Transport Layer Security (TLS) enable secure data transmission and communication over the internet. These provide a secure channel of communication between two parties (client and a server). These protocols require the use of four additional protocols in order to create a session. Record Protocols are used to ensure trustworthiness and secrecy, Handshaking Protocol is used to negotiate session variables, Cipher Spec Protocol is used to install newly negotiated connections, and Alert Protocol is used to alert any type of error.Attack mechanism: The process of certificate validation is critical to security. If the attacker has a valid certificate, he or she has hacked a CA or forced it to issue one. If the attackers have an invalid certificate and the victim ignores the security warnings, they may succeed.

Defence mechanism: solutions for defending SSL/TSL attacks uses third party entities for protection of first connection of new domain, scalable certificate attestation and minimum web applications requirements. However, they raise operational and deployment costs, complicate certificate revocation processes, and introduce additional privacy concerns to the trust paradigm. Forged Certificates Detection (these provide additional data regarding the certificates to validate the certificates origin and use third parties), Certificate Pinning (deals with hosts public keys and servers publish the public keys and the certificates and users verify any changes in them), Multipath Probing (it is not a global attack) are some of the defense mechanisms against TSL/SSL MITM attacks (attackers in this mechanism cannot impersonate clients therefore it blocks most of the MITM attacks).

2.2. BGP BASED MITM ATTACK:

The network reachability information is exchanged via the Border Gateway Protocol, an inter-autonomous systems protocol. This data is utilized to create an AS connection graph, which is

used to enforce specific policy choices at the AS level. BGP is a fundamental internet routing technology that allows Ass to choose the quickest route for data delivery. This typically chooses the shortest AS route, which has the fewest amount of AS names. Because BGP does not conduct peer-to-peer authentication, it does not offer security against MITM attacks.

Attack mechanism: This BGP related MITM attack is based on IP hijacking and thus is sometimes known as BGP hijacking or prefix hijacking or route hijacking. IP hijacking occurs when a hacked BGP speaker advertises that AS may access more particular routes with lengthy network prefixes. When a BGP MITM attack is conducted, communication intended for a certain IP address does not reach its target. To carry out such attacks, the adversary needs configure routers to advertise network availability. Then, inside the global routing database, it must advertise particular routes. The attacker then directs the network traffic to the proper locations. Some parts of the internet are lost as a result of these BGP MITM attacks.

Defense mechanisms: Researchers surveyed BGP security and focused on weaknesses to make the protocol more secure.

2.3.MITM ATTACK BASED ON FBS:

A hostile attacker impersonates a transceiver base station in a false base station (FBS) attack. A false BTS may imitate a genuine BTS by broadcasting BTS signals over the air, allowing nearby mobile phones to interact with it. It has a real-time jamming mechanism that disables all active connections. The jammer mechanism forces victims to connect to false BTS since the adversary can drown legitimate BTS. FBS-based MITM attacks are susceptible to systems that do not verify network authenticity or display one-way authentication. A third party may compel the victim to connect to a false BTS, causing the victim's network traffic to be manipulated. In order to carry out an MITM attack, the adversary may utilize phony BTSs with various protocols.

2.4.MITM attack based on GSM:

The BTS and mobile stations that make up the GSM architecture interact with each other through radio links. The BTS connects to the mobile switching center's base station controller connections, which route signals to any fixed network. The GSM design uses two databases: the visitor location register (VLR) and the home location register (HLR). HLR keeps track of subscriber information and current location, while VLR keeps track of visiting users' information. GSM took security into account and ensured the cellular network's integrity and privacy. Authentication, user data, signal protection, and privacy are all met by the GSM security standards.

Attack mechanism: Idea behind MITM attack on GSM is to impersonate mobile network code to false BTS and convince station to be valid for the victim. The adversary's network is made up of a mix of fake MS and false BTS. The fake BTS utilized must be more powerful and closer to the target than the real. In order to conduct a GSM-based MITM attack, the attacker must take the following steps.

- The attacker establishes a connection between the genuine MS and the phony BTS.
- The fake MS impersonates the victim's MS.
- The cipher suites and authentication information are sent to the fake BTS via MS.
- The communication is forwarded to the genuine BTS by the adversary.

- Authentication response and challenge between a valid BTS and a legitimate MS exchange.

Defense mechanism: better cipher algorithms and better authentication protocol can be used to prevent MITM attack on GSM. Researchers proposed a method for VLR authentication that relies on HLR-generated certificates and a secret key. It is possible to enhance this approach by requiring mutual authentication for all communications. However, this protocol was still susceptible to a brute-force assault. This method is also unsuitable for roaming users and requires regular architectural modifications.

2.5. MITM attack based on UMTS:

UMTS is the successor of GSM, and it includes certain improvements to eliminate security flaws. The radio interface between BTS and MS is encrypted and subscriber authentication is supported by GSM. Signal traffic integrity protection and authentication token are two of the improvements and extra capabilities provided by UMTS. Stronger cryptographic primitives and 128-bit cipher keys are also supported by UMTS. UMTS networks also provide faster communication rates.

3. CONCLUSION

We examined different MITM attacks in this article and provided a thorough review of all such attacks based on impersonation methods. The descriptions of several MITM defense methods are given. The attackers are after the actual data traveling between the endpoints, as well as the data's integrity and confidentiality. MITM attacks are divided into four types in this paper: spoofing-based MITM, TLS/SSL MITM, BGP MITM, and fake base station-based MITM. This article also details the assault methods and their countermeasures. Most current MITM attacks require traffic passing via a middleman, but there isn't yet an unique MITM method, thus this might be a new study area. Several cryptographic approaches, such as elliptic curve cryptography, key distribution, and authentication mechanisms, may be used in MITM attacks.

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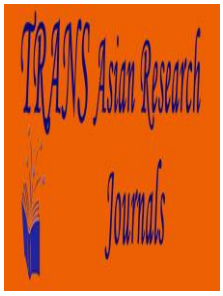

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INTERNET OF THINGS (IOT) TECHNOLOGY ASSESSMENT

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ABSTRACT

The use of conventional Internet protocols for human-to-thing or thing-to-thing communication in embedded networks is a straightforward interpretation of the phrase Internet of Things. The primary goal of the Internet of Things is to build a virtual footprint of all connected devices and people. It establishes a new means of communication between all things and humans, as well as between objects themselves. IoT allows us a new degree of connectivity. This paper summarizes all of the IoT ideas and mechanisms. RFID systems, sensor networks, and intelligence technologies are all key technologies that allow IoT. The possible uses of these technologies are discussed, as well as the main research challenges.

KEYWORDS: *Actuator, Frid, Microcontroller, Sensor, Wsn.*

49. INTRODUCTION

In the area of wireless communications, a new paradigm known as "The Internet of Things (IoT)" was presented many years ago. Kevin Ashton created this phrase in his demo in the year 1998, and its significance has grown steadily since then[1]. Incorporating Internet of Things (IoT) into embedded mobile transceivers in a broad variety of products would take information and communication technologies to a whole new level. The Internet of Things (IoT) is a critical component in corporate change. The concept of the Internet of Things was examined during the 20th Tyrrhenian workshop on digital communications. The Internet of Things (IoT) is defined as a network of different “things” or “objects” around us, such as sensors, mobile phones, and Radio Frequency Identification (RFID) tags that interact with one another and effectively perform their duties using a unique addressing system[2].

To comprehend the Internet of Things, we must first comprehend the function of RFID technologies (used to identify and communicate with other devices). Wireless Sensor Networks (which compose information gathering, processing, and transformation), intelligent technologies (to solve issues and initiate and regulate machine-to-machine interaction), and Nano-meter technologies are the mainstays of the Internet of Things (to construct small devices in order to socialize the IOT applications). In the area of IoT, research is continually being done to make it easier to use while also increasing the security of the data transmitted via it. In Japan, the Unique Identifier (UID) is the best architecture, and the EPC worldwide networks provided by Auto-Id labs are the finest in the sector. The primary goal of these organizations is to create a system that connects every item using RFID tags and wireless communications on a global platform known as the "Internet." Every object is given a unique name known as an Electronic Product Code (EPC) and is controlled by the RFID system. In 2009, IBM CEO Palmisano proposed the idea of a "Smart Planet" by incorporating sensors into all things and other systems such as railroads, electricity grids, and other gadgets that interact with one another and other devices using intelligent architecture[3].

The concept of "Sensing China" was first proposed in 2009, and a sensor network hub was established in Wuxi, Jiangsu Province, which is a major source of science and technology patents in the nation[1]. The entire principle amount is about 11.1 billion RMB. Other big nations have also begun research in this area in order to build stronger IoT infrastructure.

50. DISCUSSION

IoT has been described or defined from a variety of viewpoints, and as a result, IoT is explained in a variety of ways. The two terms "Internet" and "Things" are the primary reason for the many meanings. The term "internet" refers to a collection of networks and entities that are mostly made up of generic items.

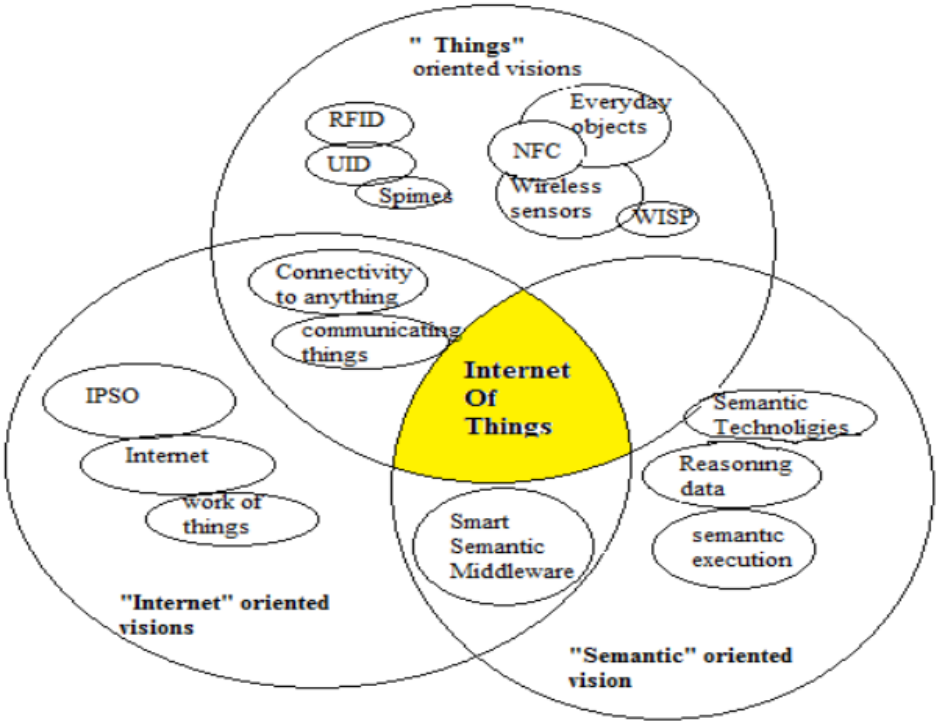

Fig. 1: Convergence of different visions of IoT[4].

When you mix the terms Internet and Things, you get a whole new level of progress in the world of ICT. The phrase "Internet of Things" refers to a worldwide network of linked things with a unique EPC, or address. The most perplexing job in this system is identifying the objects and preserving the information transferred. As a result, a new notion of semantic viewpoint emerges in the IoT. The IoT idea is shown in Fig. 1, which shows the convergence of the three circles. CASAGARAS consortium presented an advanced method that is much superior to RFID's approach[5]. The consortium's primary goals are twofold.

i. It supports IoT globalization, which allows us to link the virtual and physical worlds.
ii. Assists with current and future internet and network improvements.

IoT is a natural enabler for the implementation of independent federated services and applications, with a high degree of autonomous data collection, event transmission, network connection, and interoperability. A thing focuses on combining generic items into a framework that is simple to access, whereas the Internet focuses on creating an integrated network. A forum founded in 2008 in line with the IP for Smart Objects (IPSO) alliance, which includes a protocol that links a huge number of battery-powered communication devices. This shows that IP offers a variety of methods for making IoT a reality. By integrating IEEE 802.15.4 and IP addresses, as well as 6LoWPAN, IoT may be made to operate. IoT implementation is largely determined by the architecture, which consists of many levels ranging from the field data collection layer to the application layer on top. These layered architectures are designed to meet the needs of different industries, companies, society, institutions, and governments, among others. A typical layered design for IoT is shown in Fig. 2. The layered architecture is divided into two halves, with an Internet layer in the middle to provide a common communication medium. The two bottom levels help to capture data, while the two upper layers are in charge of data usage.

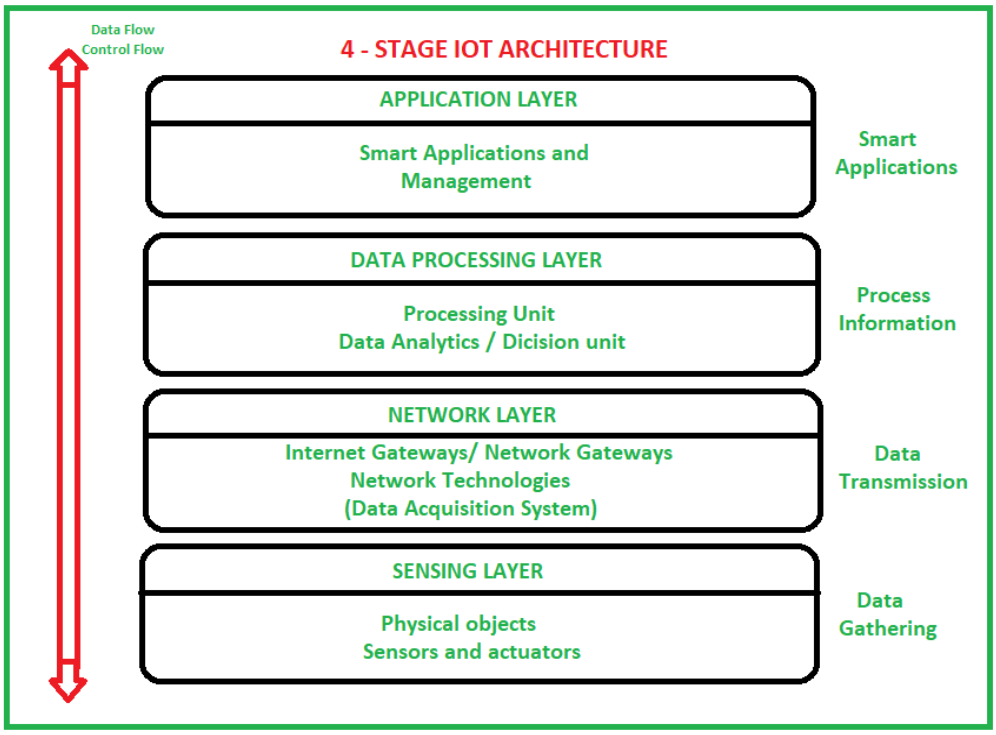

Fig. 2: Layered architecture of Internet of Things[6]

- **Edge layer:**

Embedded systems, sensor networks, and other types of hardware are included in this hardware layer. The main data sensors that have been installed are among them. RFID tags, sensor networks, and embedded edge processors are all provided by these hardware components.

- **Access gateway layer:**

This is where the initial stage of data handling takes place. It can conduct cross-platform communication as well as message routing, publishing, and subscribing.

- **Middleware layer:**

In bidirectional mode, this is the most important layer. It serves as a link between the hardware layer and the application layer at the top of the stack. It is in charge of essential tasks including device management and information management, as well as data filtering, data aggregation, semantic analysis, access control, and information discovery, such as the ONS (Object Naming Service) and EPC (Electronic Product Code) information service.

- **Application layer:**

This layer sits at the top of the stack and is in charge of delivering various IoT apps to diverse consumers. Manufacturing, logistics, retail, environment, public safety, healthcare, food and medicine, and other industry verticals may all have uses. With the maturation of RFID technology, a slew of new applications are emerging that fall under the IoT umbrella.

50.1. Applications:

IoT allows items in our daily working or living environments to interact and comment on data gathered from their surroundings, allowing for a wide range of applications. IoT applications that are either immediately relevant or closer to our present living environments are divided into three areas.

50.1.1. Supply Chain Management:

In the Internet of Things, real-time information processing technology based on RFID and NFC is utilized. We can precisely monitor and manage real-time data, work-in-progress, and in-transit phases, and get dependable due dates. This would result in a more accurate prediction and an increase in the forecast[7]. It would be feasible to automatically replace out-of-stock items and reduce inventory. It would just take a few days to implement these technologies, and they would operate with no safety stock. Transportation Sensors, actuators, and processing power will be added to cars, buses, and taxis, as well as road junctions. Important data may be gathered to assist with traffic control and direction, depot management, and providing visitors with relevant transit information. The Traffic Information Grid (TIG), which is deployed on Shanghai Grid, is one of the most significant IoT applications.

50.1.2. Healthcare:

RFID, WSN, and other IoT technologies may have a lot of applications in the healthcare field. A person's health condition, for example, might be deduced from RFID tags on clothing or the discovery of a wearable medical equipment[8]. Hospital applications may be divided into four categories: hospital personnel and patient monitoring, person identity and authentication, automated data gathering and sensing, and remote healthcare.

50.1.3. Disaster Alert and Recovery:

Natural catastrophes and unintentional disasters have become more common in recent years. RFID and WSN technologies play a critical role in predicting disasters and assisting with recovery when they occur[9]. Residents in the surrounding region would have more time to prepare themselves if they had timely access to appropriate information about dangerous environmental conditions, minimizing the amount of damage and casualties caused by the event. WSN allows for the collection, analysis, and transfer of environmental data from catastrophe sites to potentially vulnerable cities. Authorities may then utilize this information to quickly evaluate urgent situations and arrange resources. In the event of an accident catastrophe, for example, immediate monitoring and location of trapped employees using RFID technology may enable prompt rescue and reduce fatalities and economic damage to the greatest degree possible. The rescue operation would be more targeted and time efficient if the trapped employees' geographic distribution and relative precise location were known. Apart from the aforementioned applications, many others may be classified as futuristic since they depend on technology (communications, sensing, materials, and industrial processes) that are yet to be developed or whose implementation is too difficult. Robot taxi, city information model, and improved gaming room were among the most attractive future uses.

50.2. Open Issues:

50.2.1. Standardization:

Although scientific communities, European Standards Organizations (ETSI, CEN, CENELEC, etc.), Standardization Institutions (ISO, ITU), and global Interest Groups and Alliances (IETF, EPC global, etc.) have made significant efforts to standardize the IoT paradigm, they are not integrated in a comprehensive framework. Efforts to standardize have centered on three main areas: RFID frequency, communication protocols between readers and tags, and data formats utilized on tags and labels[10], [11]. Major standardization organizations working with RFID technology include EPC Global, the European Commission, and ISO. The primary goal of EPC worldwide is to promote the global adoption of an EPC for each tag as well as associated industry-driven standards. The European Commission has put together a coordinated effort to define RFID technology and assist the move from localized RFID applications to the Internet of Things. ISO, on the other hand, is concerned with how to modulate, use frequencies, and avoid collisions from a technical standpoint.

The Machine-to-Machine (M2M) Technical Committee has been established by the European Telecommunications Standards Institute (ETSI) to undertake standardization efforts related to M2M systems and identify cost-effective M2M communications solutions. Standard Internet, Cellular, and Web technologies have been utilized to solve standards due to the absence of standardization of this driving paradigm towards IoT. As a result, the ETSI M2M committee intends to create and maintain an end-to-end architecture for M2M (based on an end-to-end IP concept), as well as enhance M2M standardization activities. 6LoWPAN and ROLL are two working groups of the Internet Engineering Task Force (IETF) that deal with integrating sensor nodes into IPv6 networks. The goal of 6LoWPAN is to create a collection of protocols that will allow IPv6 to work with low-capacity devices. The core protocols have already been defined. While ROLL has just released the RPL (pronounced "ripple") proposal for routing across low-power, low-loss networks, such as 6LoWPAN. To achieve a complete answer, a large number of contributions are required.

50.2.2. Security and Privacy:

The primary issue of security is authentication and data integrity. Authentication is especially challenging in IoT situations due to a lack of appropriate infrastructure and servers to transmit messages across nodes[12], [13]. Furthermore, compared to PCs, PDAs, mobile phones, and other devices, objects have less resources to do sophisticated computations. Some authentication solutions have been suggested, however they all have significant flaws and will not help address the issue of man-in-the-middle attacks. An attacker cannot alter data in a transaction without the system noticing the change, according to data integrity solutions. The issue of data integrity has received a lot of attention in the conventional information field. There will be a new issue when RFID systems and sensor networks are linked into the Internet. Sensor nodes or RFID tags are dispersed over a large region and are unattended for the most part. Adversaries may alter data while it is stored in the node or as it travels across the network. Memory is secured in most tag systems to safeguard data from the first kind of attack, and solutions have been suggested for wireless sensor networks as well.

Messages may be secured using the Keyed-Hash Message Authentication Code (HMAC) method to protect data against the second kind of attack. To help with security, several cryptographic methods have been suggested. Such solutions cannot be fully applied to the IoT since they will incorporate IoT components with limited energy, communications, and computing capabilities, such as RFID tags and sensor nodes. As a result, new solutions are needed in order to strike a balance between security and resource scarcity. The right to privacy may be thought of as a personal property or right. People's privacy concerns in the IoT are mostly related to data collection (which of their personal data is being gathered, who is collecting it, and when), data usage (only for approved services by authorized service providers), and just started data gathering (the collected data should be stored only until it is strictly needed). There are two issues with data gathering in RFID systems. On the one hand, most RFID tags are passive and respond to reader inquiries regardless of the owner's preference. Individuals' data may be gathered in this way without their knowledge.

An attacker, on the other hand, may listen in on a tag's response to another authorized reader. Authentication of authorized readers, as previously stated, cannot address the first kind of issue. In order to negotiate privacy on behalf of individuals, a new mechanism based on user choices has been suggested. The aforementioned system's privacy choices may be enforced by causing wireless channel collisions with responses sent by RFID tags that should not be read. Malicious readers may still identify the existence of RFID tags by scanning even using encryption to shield communication from eavesdropping.

There is a novel family of solutions suggested for the aforementioned issue, where the signal sent by the reader takes the form of pseudo-noise. Because the RFID tags modify such a chaotic signal, hostile readers are unable to identify its transmission. To address the issue of unauthorized use of acquired personal data, solutions have been suggested, most of which depend on a mechanism known as a privacy broker. The proxy communicates with the user on one hand and with the services on the other, ensuring that the provider only receives the information about the user that is absolutely necessary. The proxy's preferences may be adjusted by the user. However, depending on privacy proxies, such systems have scalability issues. Individuals could not affect the policy chosen by privacy brokers. Digital forgetting is currently being researched as a significant problem that has just been identified. In reality, as the cost of storage falls, the quantity of data that can be stored grows exponentially. As a result, once information is produced, it is almost certain to be kept forever. As a result, solutions that

regularly erase information that is no longer useful for the reason for which it was created are required. Such forgetting capabilities should be supported by the complete deployment of IoT, which will need further study.

50.2.3. Governance:

In the IoT ecosystem, like in the current Internet, issues of "thin" legitimacy and a lack of adequate openness and accountability emerge. Because the Internet of Things is more than just an extension of today's Internet, but rather a network of autonomous yet compatible systems, the Internet Governance principles can no longer be used in the same way. The idea of "multi-stakeholder governance" should be seen as a new way forward in favor of the participation of the whole society, based on the regulation of the Internet. This trend calls into question the conventional notion of legitimacy and necessitates addressing the broad issue of who is a legitimate stakeholder. As a result, architectural principles must be established and documented within a global legal framework. Only if the result reflects the value of the represented stakeholders does representation become legitimate. This idea necessitates openness, accountability, and the involvement of public opinion in IoT governance, in addition to equal negotiating power and fair procedures.

51. CONCLUSION

We review the state-of-the-art on the Internet of Things in this paper, which covers a variety of definitions, enabling technologies, and various applications, as well as open research problems and initiatives. This paper, on the other hand, offers a thorough examination of the pertinent technology. The realization of the goal of "anytime, anywhere connection for anybody, we will now have connectivity for everything" is expected to rely on cross-discipline and cooperation work in related areas in the near future.

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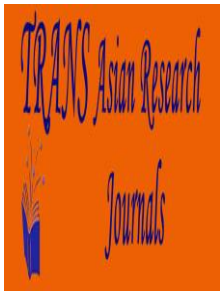

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THE ROLE OF THE VOLLEYBALL GAME IN THE SYSTEM OF PHYSICAL EDUCATION (A LOOK AT HISTORY)

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ABSTRACT

Today the content of all reforms in our country is development human factor development. Because man is the keeper, creator and perfection of all riches. Therefore, the comprehensive development of man, expansion of his opportunities, creation of conditions remains a guarantee of achieving the intended goal. In particular, it is necessary to pay special attention to human health, to development, which serves to ensure health, to develop measures and to study the existing problems. Therefore, it is important to study the effect of all omens in the development of physical education and sports. In this article, the role of the volleyball game in the system of physical education is studied.

KEYWORDS: *Sports, Volleyball, Physical Training, National Team, Bounce Endurance, Jump Endurance, Training Cycles.*

INTRODUCTION

In each period, the essence of upbringing is diverse, the meaning of which comes from social goals. Although the idea of upbringing is expressed differently, but expresses unanimity according to the nature and object of orientation.

"Physical Culture, physical education and sports are an important factor in not only physical but also spiritual perfection. He purifies the will, teaches to strive towards a clear goal, to withstand difficulties and to cope with endurance. It nurtures confidence, pride and pride feelings of victory in the human heart"[1, 67].

Some tend to consider the American Halstead from Springfield as the ancestor of volleyball, who in 1866 began to promote the game of "flying ball", which he called volleyball. Let's try to follow the development of the ancestor of volleyball.

Preserved, for example, the chronicles of the Roman chroniclers of the 3rd century BC. They describe a game in which the ball was beaten with fists. The rules described by historians in 1500 have also reached our time. The game was then called "faustball". Two teams of 3-6 players

competed on a 90x20 meter square separated by a low stone wall. The players of one team tried to shoot the ball over the wall to the opponents' side.

The inventor of volleyball is William Morgan, a teacher of physical education at the College of the Young Christians Association in Holyoke (Massachusetts, USA). On February 9, 1895, he hung a tennis net at height of 197 cm in the gym and his students, whose number on the court was not limited, began to throw a basketball camera over it. Morgan called the new game "mint net". A year later, the game was demonstrated at a college conference of the Young Christians Association in Springfield and at the suggestion of Professor Alfred T.Halsted, received a new name - "volleyball". In 1916, the first rules of volleyball were published.

The basic rules of the game were formed in 1915-25. In the countries of America, Africa, Europe, volleyball was practiced with six players on the court, in Asia - with nine or twelve players on the 11x22 m court without changing the positions of the players during the match.

MAIN PART

In 1922, the first nationwide competitions were held – the YMCA championship was held in Brooklyn with the participation of 23 men's teams. In the same year, the Basketball and Volleyball Federation of Czechoslovakia was formed – the world's first volleyball sports organization. A commission was formed, which included 13 European countries, 5 American countries and 4 Asian countries. The members of this commission adopted the American rules as the main ones with minor changes: measurements were carried out in metric proportions, the ball could be touched with the whole body above the waist, after touching the ball on the block, the player was forbidden to touch again in a row, the height of the net for women was 224 cm, the feed area was strictly limited.

In 1949, the first World Championship among men's teams was held in Prague. In 1951, at the congress in Marseille, the FIVB approved the official international rules, and an arbitration commission and a commission for the development and improvement of the rules of the game were formed in its composition.

The 1980s. New rules. In volleyball, the activity of the game takes place on both sides of the net, which is 2,43 cm above the floor height (for men), and the need to perform multi-joint blocking actions during 3-5 part-time games (60-90 minutes), during which the attack blows, a high degree of developed sakrovchanlikeness and jumping resistance is required.

"Judging by the statistics, the slowdown in the resistance of the gum and jump in the volleyball players by going to 4-5 parties of the competition games, as a result of which the effectiveness of the attack and the blocking fell (A.V.Belyaev, Savin M.V. 2009; A.V.Sukhanov, E.V.Famin, L.V.Boligina, 2012; A.V.Osadchi, 2006). Therefore, it is of urgent importance to study the dynamics of changes in these special physical qualities in different cycles of the annual preparatory process"[2, 121].

Execution of attack and defense methods in modern volleyball with a useful result depends on the degree of development in the appropriate direction of specific types of force, which are related to the activity of the "hand-foot" (A.V.Belyaev, 2009; A.V.Sukhanov, 2012 and etc.; A.G.Garipov, 2009 and etc.). In this regard, especially explosive, dynamic, inertial and reactive power types are paramount importance. It was noted by the authors that it is expedient to go to the Coordination of technical and tactical methods of execution of such types of power with the help of stand-by exercises, starting from the age of adolescence. Because it is from the age of 15-

16 that the advantage of shading these power types in a direction adapted to the upcoming game function (amplua)is known from advanced experience (L.P.Sergienko, A.V.Ablikova, 2016; S.V.Garkusha, 2005).

In 1984, Paul Libo was replaced as president of the FIVB by Dr. Ruben Acosta, a lawyer from Mexico. At the initiative of Ruben Acosta, numerous changes were made to the rules of the game aimed at increasing the entertainment of the competition. On the eve of the 1988 Olympic Games, the 21st FIVB Congress was held in Seoul, where changes were made to the rules of the decisive fifth game: now it should be played according to the "rally point" system ("draw-point"). Since 1998, such a scoring system has been applied to the entire match, in the same year the libero role appeared.

In the early 1980s, a jump serve appeared and the side feed almost ceased to be used, the frequency of attacking strikes from the back line increased, there were changes in the methods of receiving the ball - the previously unpopular reception from below became dominant, and the reception from above with a fall almost disappeared. The game functions of volleyball players have narrowed: for example, if earlier all six players were involved in the reception, then since the 1980s, the fulfillment of this element has become the responsibility of two players.

The game has become more forceful and fast. Volleyball has increased the requirements for the growth and athletic training of athletes. If in the 1970s there could not have been a single player taller than 2 meters in the team at all, then everything has changed since the 1990s. In high-class teams below 195-200 cm, usually only a binder and a libero.

Since 1990, the World Volleyball League has been played, an annual cycle of competitions designed to increase the popularity of this sport around the world. A similar women's Grand Prix competition has been held since 1993.

Varieties of volleyball. Beach volleyball. There is also another kind of game - beach volley (sand volleyball, beach volleyball). Sand volleyball in the twenties and thirties was played in Bulgaria, Latvia, the USSR, the USA, France, Czechoslovakia. Beach-volley with two players on the court appeared in the USA in 1930. At the end of the twentieth century, beach-volley became very widespread in the world and in 1993, at the IOC session in Monte Carlo, it was recognized as an Olympic sport.

Now the official FIVB calendar includes the following beach-will competitions: tournaments in the program of the Summer Olympic Games (since 1996), World Championships (since 1987 for men, since 1992 for women) and the World Tour (since 1989 for men, since 1993 for women), the stages (tournaments) of which are held in different countries during the season.

Mini-volleyball. A game for children under 14 years old. Mini-volleyball appeared in 1961 in the GDR. In 1972, its rules were officially approved. There are two levels: mini-3 and mini-4. Each team has three (four) players plus two substitutes. Both boys and girls can play for the team at the same time, but their ratio in the rival teams should be the same. The game takes place on a 6x4.5 (6x6) m platform, divided in half by a grid at a height of 2.15 (2.05) m. Ball weight: 210-230 grams, circumference: 61-63 cm. The game in the game goes up to 15 points.

Pioner ball. Its main technical difference from classical volleyball is that the ball is picked up during the game. Accordingly, the submission, the pass to the partner and the transfer of the ball to the opponent's side is carried out not by a blow, but by a throw. The match consists of three games, the game in which is played up to 15 points. The team that wins in two games wins.

Pionerball is included in the program of secondary schools for physical training and is a preparatory stage in mastering the basics of not only volleyball, but also basketball.

Wallyball (English "wallyball", from "wall" – wall) was invented in 1979 by American Joe Garcia. Two teams of two, three or four people play. It is allowed to use the side walls of the gym. The game is played up to 15, 18 or 21 points (but the difference in the score must be at least 2 points). There are many representatives of classical volleyball among the volleyball players, including members of the US Olympic team Paul Sunderland and Rita Crockett, and famous people from the world of politics and show business, including US President George W.Bush. In the early 1980s, businessman Mike O'Hara (formerly a member of the U.S. Olympic team) founded the company "Wallyball International Inc." (WII), which took over the organization of regional and international tournaments in the country. In 1989, several members of the WII executive committee who did not agree with O'Hare's policy created the American Volleyball Association. The Association has held a number of alternative events in the USA and international tournaments in different countries. Currently, both organizations are practically inactive. In November 2001, through the efforts of the inventor of the volleyball, a non-profit United Association of volleyball players was formed. Garcia intends to revive the former interest in his brainchild and achieve its recognition as an Olympic sport. Now several million people are engaged in volleyball all over the world.

Faustball. Faustball (from the German "Faust" - fist), in English–speaking countries the name "fistball" (English "fist" - fist) is adopted. One of the oldest sports. The first rules were adopted in 1555 in Italy. At the end of the 19th century, the game came to Germany, which eventually became the center of world faustball. Currently, the game is extremely common in a number of European countries, as well as in North and South America, Japan and some African states. Faustball is played by two teams of five players each (plus three substitutes) on a 50x20 meter court - both indoors and outdoors. The game consists of 2 15-minute halves. If the rules of the tournament exclude a draw in the match, then in case of a draw, two additional 5 minutes are assigned, if necessary, two more, etc. - until one of the teams wins with a margin of at least two points. The ball is slightly heavier than a volleyball ball (320-380 grams). Instead of a net, a rope is used, stretched at a height of two meters.

CONCLUSION

Conditions were created in accordance with the modern requirements of the younger generation for regular physical education and mass sports, strengthening confidence in their will, strength and opportunities in young people through sports competitions, perfection of courage and patriotism, feelings of loyalty to the motherland, selection of athletes from among them and systematic organization of purposeful training were carried out. In conclusion, the application of modern forms and techniques of teaching in the lessons plays a big role in the conscious, quick, thoughtful thinking of students. We will also be able to guarantee the achievement of education, quality and efficiency, the training of competitive personnel, if teachers are able to master pedagogical technologies and apply them efficiently in practice in their activities.

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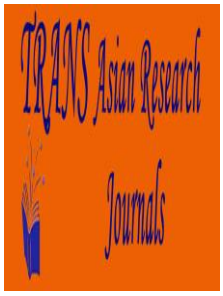

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ANALYSIS OF FOREIGN EXPERIENCE ON THE DEVELOPMENT OF ECO-AESTHETIC CULTURE OF FUTURE PRESCHOOL EDUCATION SPECIALISTS

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ABSTRACT

At the new stage of development of Uzbekistan, issues of reforming education, bringing new approaches to it, as well as studying advanced foreign experience, researching the position of developed countries in the training of personnel and localization of productive aspects is becoming relevant. In order to carry out such a responsible task at an excellent level, it attaches great importance to the rapid development of national science and personnel training system.

KEYWORDS: *Education, Culture, Innovation, Educational Effectiveness, Preschool Education, Culture, Eco-Aesthetic Culture.*

INTRODUCTION

The most important of modern education has been formed since ancient times. The purpose, content, form, method and tools of education are considered to be traditional categories applied to analyze the content of educational processes. The same categories arise as the subject of pedagogical activity, which constitutes the educational process of a certain subject, specialty or specialty. As the president of the Republic of Uzbekistan ShavkatMirziyoyev noted in his speech at the expanded meeting of the Cabinet of Ministers dedicated to the main results of socio-economic development of our country in 2016 and the most important priorities of the economic program for 2017: "at previous meetings, the state of affairs in the field of education and science, the implementation of due to the fact that the implementation of the actual tasks in this area is of strategic importance for the future of our youth, society and the country, the work in this area is personally entrusted to the head of State. I draw your attention to the implementation of the following tasks. The first task is in the field of preschool education"[1, 44-45].

During the current year, the head of our state adopted a number of important documents on improvement of preschool education as an integral and primary link of continuous education system. Further improvement of the pre-school education system, strengthening the material and technical base, expansion of the network of preschool educational institutions, provision of

qualified pedagogical personnel, radical improvement of the level of preparation of children for school education, application of modern educational programs and technologies to the educational process, comprehensive moral and educational development of children, in order to create conditions for aesthetic and physical development, the decree of the president of the Republic of Uzbekistan № PP-2707 "on measures for further improvement of the preschool education system in 2017-2021" dated December 29, 2016 was adopted. The main objectives and directions of the "program on further improvement of preschool education system for 2017-2021" approved by the same decree to create conditions for comprehensive, moral, aesthetic and physical development of children taking into account the advanced foreign experience.

MAIN PART

Further expansion of public and non-public sectors of preschool institutions, creation of conditions for the formation of a healthy competitive environment between public and non-public preschool institutions, introduction of new forms of preschool institutions under the conditions of public and private partnership, as well as, In order to ensure effective organization of the activities of the Ministry of preschool education of the Republic of Uzbekistan, the decree of the president of the Republic of Uzbekistan "on Organization of the activities of the Ministry of preschool education of the Republic of Uzbekistan" on September 30, 2017 was adopted. In this decision, it is envisaged to carry out large-scale activities in order to eliminate the existing problems in the reform of the pre-school education system, including the effective organization of the process of professional development of pedagogical and managerial staff, the use of modern pedagogical and information technologies, advanced experience of foreign countries, provision of educational institutions with highly qualified,

In order to further improve the preschool education system, which is an important part of the continuous education system, in accordance with this decision, the task of the Ministry of preschool education of the Republic of Uzbekistan, the Ministry of preschool education of the Republic of Karakalpakstan, the main department of preschool education of Tashkent City, the Departments of preschool education of regions and their Ministry of preschool education of the Republic of Uzbekistan, among the main tasks and activities of its regional divisions, taking into account the advanced foreign experience, has established conditions for the comprehensive spiritual, moral, aesthetic and physical development of preschool children. Below is an analysis of the experience of several foreign countries.

Features of the pre-school education system of the Russian Federation[2] public policy within the framework of education is built on the ideas of humanism and democracy, which are reflected in the law on the Constitution and education of the country. It is directly stated in these documents that education is the process of teaching and educating a person purposefully oriented towards the benefit of the state, society and the individual. The composition of Russian education includes educational programs and state standards and directions of various degrees, as well as governing organizations – in addition to the educational system and institutions subordinate to the educational system. Preschool education is the first step in the system of education of the Russian Federation. The idea of giving the opportunity to receive education even for children of the youngest age appeared after the establishment of the "regulations on the single labor school" in 1918 year. From the date of adoption of the charter, it is guaranteed that every child can have the right to study, starting from birth. Today's educational standards are expressed in the International Convention on the rights of children, which states:

– Children should be able to attend educational institutions;

– Adult children should be provided with conditions for reading activities;

– It is necessary that education covers all the necessary conditions to prepare the little man to understand his life within the framework of society;

– The interaction of the participants in the learning process should be based on the expression of respect for the child. The system of pre-school education in Russia is constantly changing, it is constantly updated, changing its appearance and improving. The first teachers for the child are his parents. They should educate children in matters of infancy, social and moral.

The activities of pre-school educational institutions (NSM) are aimed at helping families to acquire knowledge and at the next stage of education. Some experts do not need kindergartens, and pre-school education should be entrusted to full-time parents, and they themselves argue that they will decide where and how to prepare the child for the 1st class. But according to statistics, most of the services of PEI are used by parents. Therefore, the strategy for the development of the educational system defines the modernization of Russian preschool education as one of the first-level issues in the future. According to the standard regulations, children's educational institutions are divided into five types:

– Kindergartens that recognize the implementation of one or two directions of development as important;

- Kindergartens of the compensatory type, aimed at the competent correction of children whose psyche has deviated from the norm;

- Kindergartens, where health exercises are conducted with children under the supervision of a tutor;

- Kindergartens, where general development, health improvement and compensatory groups are concentrated in different variants on their territory;

- Centers for early development of children

– The system of preschool education is characterized by multifunctionality, colorful planning, the direction of Priority Development and the determination of various programming, so that kindergartens can become healthier, acquire new knowledge and abilities, receive mental support. The system of pre-school education of Russia is based on the concept of "modernization of the educational process". In this concept, an important role has been given to the provision of quality indicators of Education. This document is based on the law on education, the Constitution of the Russian Federation, the standard regulations on NPM and other decisions of the Ministry of Education. It is mentioned in the concept that it is necessary to update the content of training based on the useful experience of individual organizations.

Theoretical research has shown that stereotyped approaches to filling the content of preschool education should be modified, while the process of teaching should be seen on the basis of the following principles departure:

– On the basis of the developing nature of teaching, the conduct of teaching manifests the hidden and potential qualities of children;

– Systematic education helps children to determine the interconnectedness of events, objects under study and life values;

– The development of the child relies on rational forms of acquisition of knowledge corresponding to his feelings and age;

– The content of multicultural education consists in bringing the little ones closer to the originality of culture and traditions of their native and other nationalities and nationalities, resisting the opinion of others, expressing their discontent, anger and sadness in a normalized manner;

– It is based on the need for a healthy lifestyle of health, the need to follow the rules of hygiene and engage in sports.

The English system of preschool education [3] Great Britain is a state of unique culture and traditions. The English teaching system is considered to be one of the best systems in the world, the Britain training programs comply with the highest standards. The provision of preschool education in the UK has been largely due to the efforts of poor working families to volunteer assistance to their children. In 1816, Robert Owen first opened a kindergarten in Scotland for the first time for the children of his factory workers. At the beginning of the twentieth century, several kindergartens were opened on the initiative of the sisters Macmillan, in which care was shown for the health and well-being of their children, mainly in low-income families. Stages of development. In 1988 year, the law "on education" came into force, in which it established not only the standards of education, but also the basic assessment of the level of mental development at the time of admission of children to school. Compulsory education in England, Scotland and Wales starts at the age of 5 years, and in Northern Ireland at the age of 4 years. The deadline for the start of training is considered the earliest in Europe. Preschool education fell into the category of priority direction in 1996 year after the adoption of the law on the system of preschool education. The main purpose of its adoption is to improve the quality of teaching in kindergartens, increase the standard of education and increase the financing of early education. Within the framework of the proposed system, a specific training plan should be established, the implementation of which must meet the requirements of the state educational system of the preschool institution. Special attention is paid to children who need special needs and English is not their native language. It is worth noting that the difference between the upbringing and education of children does not exist in all countries. In Great Britain, however, two is also recognized as significant and necessary. In the United Kingdom, there are 25 types of institutions that provide such services, and therefore the education system here is diverse and not equal in importance. Since 1997, the reform of early education is being carried out in England. Prior to this period, the approach to early education and training was not systematized – the preschool institution could apply the types of training program or service as desired. This situation led to the spread of "unique" approaches that are not concentrated on a single educational system. The quality of services for training was hostels changed. While preschool education for children aged 3-4 in England was recognized as one of the best in Europe, in the UK only 20 percent of children were used to it by the beginning of the 90-ies of the last century. The reform adopted was aimed at the production of a single educational program for the upbringing of children aged 3-4 years. In 1988 for the development of preschool education 15 billion. funds in dollars are credited. At the same time, by 1997 year in the UK there was not a single private system of preschool education, but so far their number has exceeded 20. The kindergarten is financed by the state only after the state registration. In kindergartens, extinction is conducted by independent experts, the results of which are published in open media. According to the results of the state examination in 1977, 77 percent of preschool institutions did not comply with the accepted

standards: there were no detailed educational plans in kindergartens, no children's development monitoring system was provided, no clear link between the various aspects of educational programs was established. 40 percent of the expert reports indicate that teachers do not have enough concepts about the state of children's development; there is no proportional system of interaction between the activities proposed by the child and the activities organized by the educator in accordance with the educational program.

Today, such problems are partially solved by themselves, but the big difference between the training of kindergarten graduates and the extreme requirements of school leavers for preschool education "how should the child develop? "there is a number of disagreements between the theoretical point of view and the current approach of educators to this issue. It should also be noted that work in preschool institutions all over the UK is not carried out within the same educational standards. For example, in the Scotland, reforms in the field of early education - are not related to the early support centers (about which it is told below). In contrast, open seminars and conferences are held, where educators exchange experiences with ways of demonstrating the characteristics of their approach to the educational process. Approach to education.

In Great Britain, education is usually directed not to the subject or teacher under study, but to the child. This approach is based on the history of English education, whose development was influenced by Russo, Frebel, Montessori. They believed that it is necessary to develop the individuality of the child and protect his independence. The main objectives of preschool education are: to meet the needs and interests of each child, to respect the difference between children. Such is assumed that the child is inquisitive and instinctively brisk, has an inner desire to read. Training should be conducted during the game, which the child himself proposed. The main task of the teacher is not to pamper the child, but to support the game, providing him with various materials for conducting research. On the study of the system of preschool education of Great Britain. Y.Kwong conducted a large research work. He conducted questionnaires between employees of kindergartens and parents, observed the activities of kindergartens. Freely 10 pre-school educational institutions were selected for the study, of which two groups were regularly monitored for five days. In groups of English kindergartens, children are brought up in an amount not exceeding 25 people (the number of educators and children is taken together in a ratio of ten). The results showed that 75 percent of English educators believe that it is inappropriate to motivate children from outside to be interested in learning (for example, the form of competition among children).

On the basis of such a position lies scientifically based data. For Example, in the study, M.Lepper and D.Grin an example is given that children of preschool age are rewarded for drawing (children are very interested in this). After that, the children did not want to draw on their own in their spare time, but only wanted to draw for the prize. In other words, internal motivation in children is lost, and external motivation is replaced by it. In the English kindergarten, children are engaged independently for a long time, and the educator follows them from the outside. Only 15 percent of the total time is allocated for group training under the guidance of a teacher. Such training is conducted in small groups, the level of development of which is made up of children equal to each other. In this way, the rule of taking into account the development of preschool children is practically applicable. Almost all educators believe that for the diagnosis of both the degree of development and mental formation of children, it is necessary to use the method of meaningful role-playing games, drawing and making things. In practice, in English kindergartens (except for compulsory classes in the current language and mathematics),

they attach great importance to research activities through games with water, sand and moving games. In pedagogues for meaningful-role-playing, there is almost no time left. How can I work as a tutor? In order to obtain a work permit in the kindergarten it is necessary to make appropriate preparations separately. These preparations are either basic for three years and consist of one year additional study or four years studying in different educational structures. Only 20 percent of educators have the status of a bachelor. To become a pedagogical Assistant or nanny, they need to study a special 15-hour training program. Such training can be conducted in educational associations, which are now increasing. The undoubted advantage of the system of training specialists in the UK is that it is aimed at a high level of practice. 50 percent of the classes in this regard are held in pre-school educational institutions (compared to 12 percent in Spain, 20 percent in Italy and Denmark, 25 percent in France, Belgium and the Netherlands, 30 percent in Germany and Sweden). Experts estimate that in the next 10 years in preschool institutions in the UK, jobs will increase by 250000 units.

The system of pre-school education in Germany [4] the German law establishes the free right to pre-school education. Children can be taken to the nursery from 4 months. Many Germans use this right. Grandmothers and grandmothers, who are representatives of the older generation in the Germans, after the birth of grandchildren, do not have the concept of alimony and obligations to look after them. Therefore, parents are forced to give their children to kindergartens and daycare. Surprise admire the colorful forms and types of preschool education institutions (PEI).

CONCLUSION

In conclusion, it should be said that through the direction of national education, such qualities as self-awareness, patriotism, national pride, national harmony, speech, culture of communication, national ideological consciousness, national decency self-sacrifice will be formed, as well as legal, economic, physical, intellectual, aesthetic, hygienic and other areas of education will be implemented. How a child grows up as a person depends on the influence of the teacher, parent upbringing and the environment. The child from a young age receives spiritual food from his parents, educators, comrades, those around him, imitating them, mastering many customs, manners. In the upbringing of the child, it is necessary to attach special importance to their age, spirituality and understanding, in character.

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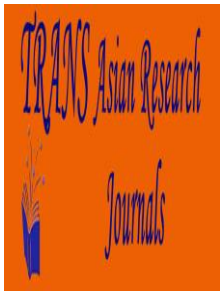

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SOCIO-DEMOGRAPHIC FACTORS OF THE NEW UZBEKISTAN AND SOCIAL PROTECTION OF THE ELDERLY POPULATION

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ABSTRACT

The article examines the problems of social gerontology of the new Uzbekistan. Various social groups and communities of elderly and old people are studied. It was found out that the process of demographic aging in Uzbekistan is more typical for women than for men. And also, on the basis of socio-demographic facts, the issues of social protection of the elderly are disclosed. In conclusion, scientific recommendations on improving the work of the state form of social protection management for the elderly and old people are presented.

KEYWORDS: *New Uzbekistan, Demographic Truth, The Process Of Demographic Aging, Social Protection, Population, The Ratio Of Elderly Persons, Elderly And Old People, People Of The Older Generation, Social Gerontology.*

INTRODUCTION

The new Uzbekistan is a state whose main goal is to ensure a free, well-ordered and prosperous life of our multinational people. It is necessary to openly declare the demographic truth. During the years of independence, that is, over the past 30 years, the population of Uzbekistan has increased by 15 million people, which is comparable to the population of one average country [1]. It is a state developing in strict accordance with universally recognized norms in the field of democracy, human rights and freedoms, based on the principles of social protection of the population, friendship and cooperation with the international community.

Over the years of independence, the population of the Republic of Uzbekistan has increased 1.8 times and today 35.2 million people live on the territory of 448.97 thousand square kilometers (23.10/2021) [2]. Currently, 2 million 873 thousand residents, out of the total population of the Republic of Uzbekistan, are over 60 years old, 225 thousand residents are over 80 years old, 44

thousand residents are over 90 years old and 8700 people are over 100 years old (2018) [3]. That is, in the constituent part of the population of Uzbekistan, the ratio of elderly persons is 10.6% [4]. Domestic demographers also highlight the problem of older women [5]. The process of demographic aging in Uzbekistan is more typical for women than for men [6]. Large-scale work is being carried out in the Republic to increase the level of literacy and vocational training of women, to realize their abilities, to create decent working conditions for them, to provide them with affordable housing, as well as various measures to protect motherhood and childhood, to ensure gender equality in the country. The further development of trends in the decline in the birth rate will undoubtedly strengthen the aging processes of the population of the republic, which will result in a faster shift in the demographic structure of the population towards older ages. Women have a higher life expectancy than men. This is a global pattern, but the overall level of differences in this indicator between men and women in transition economies differs significantly from developed countries. Uzbekistan is no exception in this regard, although the gender gap here is smaller than in many countries and tends to decrease [7, p. 131].

Since ancient times, respect, attention and care for the elderly have been a kind of moral and cultural feature of society in the republic. In accordance with this, respect for elders, giving them attention and care has turned into a kind of spiritual and cultural standard.

In this regard, the study of socio-demographic processes shows that the scientific community of the New Uzbekistan needs the development of social gerontology. Social gerontology is a social discipline designed to solve demographic and socio-economic problems of population aging.

During the last 50 years (late XX-early XXI centuries) of our century, the process of population aging on a global scale has been developing with such rapidity and consistency that any ignoring of its significance is associated with negative consequences for the social policy of any state. Currently, the elderly and old people have become the third most important category of the population, which has given rise to very serious economic, social, and medical problems, the possibility of the existence of which in the past humanity could not even imagine. By the end of the 40s of the XX century, the health and social security authorities of many industrially developed countries faced many problems that they were unprepared to meet and that required immediate solutions. However, the first place was taken by the economic problems of population aging, which contributed to a large extent to the allocation and formation of an independent academic discipline-social gerontology-with special training for scientific and practical work in countries such as the USA, Japan, England and in Western European countries. The term "social gerontology" was first used by the American scientist E. Stiglitz in the late 40s of the XX century [8].

Socio-demographic problems of modern New Uzbekistan also require special attention. Consider the demographic indicators of the aging population of modern Uzbekistan. According to domestic demographers, the aging of Uzbekistan has been felt since the late 10s - early 20s of the XXI century. As of October 1, 2021, the total number of pensioners in the country amounted to 3,548,093 people (10.9% of the total population). Of these, by age (including superannuation pensions) 2568.3 thousand people (7.9%), disability 368.5 thousand people (1.1%), loss of breadwinner 247.7 thousand people (0.7%), as well as 304.4 thousand people (0.9%) receiving social benefits [9].

As you know, the decline in the birth rate is inevitably accompanied by an aging population. Currently, these processes are taking place almost imperceptibly in Uzbekistan. Uzbekistan is not

yet characterized by the processes of "aging from above". But the consequences of "aging from below" are already visible, manifested in a relative structural decrease in children's and adolescent contingents. In accordance with the international classification, the modern gender and age structure and the size of the average age of the population allows Uzbekistan to be classified as a country with a young population [7, pp. 32-38,71]. In Uzbekistan, given the rapid development of the trend of declining fertility, depopulation can be achieved even faster. Such a situation requires the State to pursue a more effective policy of supporting and maintaining the average birth rate, capable of providing moderately expanded reproduction of the population.

By order of the President of the Republic of Uzbekistan Shavkat Mirziyoyev, the Concept of the National Strategy for Social Protection of the Population for 2021-2030 was approved. According to this concept, until 2025, on the basis of the Agency of Medical and Social Services under the Ministry of Health, Social Support Centers for the population at the level of districts (cities) will be created. The most important thing is that the state budget expenditures on social protection of the population will grow from 1 percent in 2019 to 1.5 percent in 2030 in relation to gross domestic product [10]. Thus, today, the New Uzbekistan has entered the path of development, having achieved success in all spheres of life. In particular, social work is an activity aimed at solving relationships between people, providing material and moral support.

Over the years of independence, a system of social protection for the elderly has been formed, social services for the elderly have been improved. The elderly, the elderly and long-livers, consist of various socio-demographic layers in their internal structure as a demographic social layer. At the same time, the uniqueness of this social stratum is an age indicator. In Uzbekistan, the retirement age for women is set at 55 years, for men 60 years. The retirement age of an individual can be reduced by working conditions (harm to health and difficult working conditions), the number of children in the family. In Uzbekistan, the reduction of the retirement age is 50-55 years for men, 45-50 years for women. Here it is necessary to clarify why the problem of studying social gerontology in Uzbekistan is important.

The problem of studying is that social gerontology studies the biological processes of human aging in order to find social measures and opportunities to preserve the spiritual significance inherent in old age. The problem of the living conditions and lifestyle of an old person comes to the fore here. Social gerontology is closely related to issues of general culture, being to a certain extent its measure, if we keep in mind the degree of care of the state, society and family about the old man, his somatic and psychological well-being. Integrating various aspects of the study of the aging process, social gerontology as a multi-disciplinary science has taken a strong position in the system of disciplines exploring humanity and society. Biology, ecology and sociology form a triangle within which the life of a healthy and sick person, his old age, longevity and death are studied.

The well-being of the population has increased in the republic, measures aimed at social protection of the older generation have increased. For example, in Uzbekistan, the average life expectancy has increased, as a result of the measures taken compared with 1990, the average life expectancy of a person has increased from 67 years to 73.5 years. On the basis of the decree of the President of the Republic of Uzbekistan dated October 13, 2014 "On measures to further strengthen social support for veterans of the war and labor front of 1941-1945", conditions for social protection of veterans of the war and labor front have been created, in particular, vouchers to the sanatorium are provided at a convenient time for them at the expense of the state.

Social gerontology has another important aspect of its activity - social work. Social gerontology considers one of its important tasks to study the patterns of demographic shifts in the country, the social and economic consequences of population aging, the causes of relatively low life expectancy and high mortality of people of pre-retirement and retirement age.

The process of demographic aging requires a revision of the foundations of the organization of existing health and social services, as these organizations face tasks that they are unable to solve with their modern organizational and economic capabilities. This applies to many countries of the world.

It is for this reason that material and moral assistance from social structures is increasing in the Republic of Uzbekistan. There are 33 nursing homes "Sakhovat", "Muruvvat", 11 centers for medical, social and labor rehabilitation of disabled people, 8 sanatorium adapted for the treatment of disabled people, 2 vocational colleges for the education of disabled people in the republic.

Based on the above, scientific research in social gerontology is conducted in three directions.

The social determinants of biological and mental aging of an individual are studied. The influence of the aging process on the personality at the final stages of a person's life cycle, changes in his social needs, attitudes, value orientations, motivations, structure of activity and behavior, activity, i.e. the whole lifestyle is investigated. In general, this direction focuses on the individual and personal characteristics of aging and old age.

Various social groups and communities of elderly and old people are studied. As well as groups and communities of which they are members, family, relatives, circle of acquaintances, neighbors, etc. The task of social gerontology in this case is to determine the place, role and functions of elderly people in these groups, their relationship with the group as a whole and its individual members; to investigate the influence exerted by the immediate social environment on the aging process.

The social status of the elderly and old people as a special social and age group, which is an important element of the social and demographic structure of society, influencing various social processes, is studied. This direction studies the goals, structure and functions of institutions and organizations engaged in social welfare, protection and service of old people.

Thus, in the social aspect, gerontology studies:

- Individual experiences of old people;
- The place and position of old people in society;
- Social policy in relation to old people.

The focus of social gerontology is also on the causes of early professional aging, pre-retirement and retirement periods of life, working capacity, professional and social activity of old people.

And also, at present, purposeful work is being carried out in Uzbekistan by the self-government bodies of citizens - "Mahalla" and the employment center for employment and social protection of the population. The main place in the social protection of the population, in modern conditions, is occupied by the expansion of types, requirements and changes in the basics of service, and the amount of pension funds spent. The considered theories are aimed at a comprehensive analysis and characterization of the aging process, comprehensive scientific

observation and study, enhanced support and social protection of elderly people. Every person who has reached old age passes into a new socio-demographic stratum and must necessarily be socially protected or comprehensively supported by state and non-state organizations (NGOs-non-governmental non-profit organizations).

Employees of the Ministry of Employment and Labor Relations of Uzbekistan are conducting research on the created social protection plan for the elderly. In particular, the improvement of systematic pension provision by state and non-state organizations, monitoring the implementation of the tasks of the right to work in the retirement age of older people.

The tasks of social protection of the population, in particular the elderly, the elderly and long-livers, are assigned jointly with social security to the Ministries of Employment and Labor Relations, the Ministry of Finance, Health, Pension Fund, public organizations, the Society of the Blind, the Mute-deaf, the disabled, the Red Crescent Society, the Mahalla Charitable Foundation, for healthy generation, as well as the Ministry of Mahalla and Family Support" [11].

The Ministry of Mahalla and Family Support of the Republic of Uzbekistan was established in accordance with the Decree of the President of the Republic of Uzbekistan No. PP-4602 dated February 18, 2020 "On organizing the activities of the Ministry of Mahalla and Family Support of the Republic of Uzbekistan" and Decree of the President of the Republic of Uzbekistan No. UP-5938 dated February 18, 2020 "On measures to improve the socio-spiritual atmosphere in society, further support of the mahalla institute, as well as raising the system of work with families and women to a new level"[12].

The year 2021 was declared by the President of the country "The Year of Youth Support and Public Health Promotion", the name of the year has a deep meaning. This year, in order to implement the tasks set by the state program "Year of Youth Support and Public Health Promotion", close attention will be paid to the development of the social sphere, strengthening social protection of the population and further improvement of the wage system, which allowed to increase the real incomes of the population by 12 percent compared to 2017. Starting in 2019, all pensioners have the right to receive full pensions and work.

Socio-demographic analysis reveals that a person's transition from working age to retirement age causes broad social changes in his life, that is, a person's transition from one social group to another. In this regard, it should be noted that in accordance with the Decrees of the President of the Republic of Uzbekistan for 1991-2021, the size of pensions increased 67 times [13]. As of January 1, 2016, the average monthly pension was 421,629 soums, in September 2021 -924,780 soums [13]. It is known that 96-98% of the labor resources of Uzbekistan are the age-able-bodied population. The work of pensioners and teenagers does not exceed 4% of the workforce. Of these, mostly 3.5% are pensioners [13]. In this proportion, the composition of the labor resources of Uzbekistan is determined. As a result of objective and subjective factors, qualitative and quantitative indicators of labor resources, distribution and their use are formed. This process, in turn, is associated with natural, territorial and social conditions.

It is worth noting that work has been carried out in Uzbekistan to eliminate problems related to the registration of pensions and benefits, their timely payment, access to various social services. By the Resolution of the Cabinet of Ministers "On measures to further improve the social protection system of the population and the widespread introduction of modern information and communication technologies into the sphere" dated March 5, 2021, the information system "Unified Register of Social Protection of Low-income Families" was created[14]. Only in the

Samarkand region of the republic, from November 1, 2020 to February 2021, about 158 thousand applications for social benefits or financial assistance were received. Of these, 49.6 percent, that is, 78,408 citizens, received a positive permit. In March of this year, 60.2 million soums of social benefits and 7.7 million soums of compensation were paid to 155,038 recipients of benefits and material assistance. The payment of 29.6 million soums to 68,288 recipients of benefits under the age of 2 years and 16.9 million soums to 68,488 recipients of benefits under the age of 14 years was also financed [15].

Thus, based on all this, the social worker needs to form the following main problems peculiar to the elderly:

1. The active life activity characteristic of people gradually decreases as a result of aging. A decrease in activity and performance is a sign of aging. With increasing age in the elderly, there are various diseases associated with age and disability. This condition, in turn, limits the relationship of the older generation with others. The lives of elderly people are limited.

2. A decrease in labor skills, a decrease in activity in social life, predisposes the emergence of various types of relationships to the elderly. The relations of society peculiar only to the elderly are being formed.

3. Due to aging, their emotional, psychological and physiological states are disturbed. A decrease in social activity has a negative effect on the elderly themselves.

4. There is a problem of excess free time in the elderly. Many of them who have worked well and raised enough funds, physically healthy people, after retiring, face two types of cases. In the first case, relatives say: "We worked so hard. Now rest, we will provide for you ourselves." As a result, they have fear, i.e. the feeling that they are not able to work. In another case, there is a fear of "servants" telling them "you are free from work, now do housework, look after your grandchildren, etc.".

Therefore, we can say that, based on the problems inherent in old age, the social protection of the elderly: First, we need to get rid of the views that the elderly have a sharply reduced ability to work, it is impossible to oblige pensioners to do housework, care for grandchildren. Currently, many pensioners have higher education, as leaders they have earned the honor and respect of society. Therefore, it is necessary to treat individually when implementing measures related to the implementation of social protection. You can't treat the elderly as "cheap labor." Older people will never agree with this.

Secondly, it is not necessary to work with the old methods when conducting social work with the elderly and the elderly. Especially, it is impossible to limit social work to standard methods and technologies. When determining the methods of social work with the elderly, it is necessary to take into account, as they say, that not only military force determines the strength and power of the state, it is also determined by patriotism, worldview, well-being, attention and care provided to older people.

In conclusion, we note that at present the task of improving and developing both the system of state organizations and institutions working with the elderly is urgent for society and the state. The state program for the protection of elderly people is not just words, but the policy of the New Uzbekistan, proceeding from humanity and justice. The social protection system is being improved and, most importantly, the protection of the elderly, the elderly and long-livers is developing.

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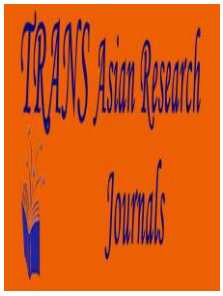

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METROLOGICAL PROVISION IN THE PRODUCTION AND ITS BRANCHES

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ABSTRACT

The article examines the definition and implementation of technical means, procedures and rules, norms, scientific and organizational bases necessary for ensuring the unity of measurements in production enterprises and achieving the required clarity, that is, significant aspects of Metrological supply.

KEYWORDS: *Metrology, Measuring Instrument, State Benchmark, State Metrological Control, Metrological Service, Metrological Supply, Production, Unit Of Measurement.*

INTRODUCTION

Measurement information is not only required by quantity, but also by quality. This includes descriptions of its (measurement) accuracy, reliability, recognition price and efficiency.

On the basis of all these qualitative characteristics lies Metrological supply.

Metrological provision can be described as follows:

Determination and implementation of technical means of coping, procedures and rules, norms, scientific and organizational bases necessary to ensure the unity of measurements and achieve the required uniformity.

Proceeding from this description, it can be said that the duty of the Metrological supply is imposed on the spouses:

- organization, provision and implementation of operational suitability of tools;
- development and implementation of normative documents on implementation of measurements, performance and recommendation of its results;
- conducting expert documentation;
- state tests of measuring instruments;

- metrological attestation and measurement of methods of measuring instruments;

There are 4 organizations of Metrological supply;

1. The scientific basis is the science of Metrological measurements.

2. The technical basis is the state benchmark of the unit of magnitude, the transfer of the unit of magnitude from the Eons to the working medium, the creation of measuring instruments and the development of the output from the burn to the road, the Metrological attestation of the mandatory state tests of measuring instruments and the methods of their performance, the utkasification of the

3. Organizational basis-UZR Metrological service consisting of state and regional Metrological service;

4. The normative legal basis is the normative acts of the relevant Republican laws, state standards, state and branches.

The main objectives of Metrological supply:

- improve product quality, production and product efficiency by automating it;
- ensuring mutual exchange of details and aggregates;
- ensuring the reliability of material accounting of wealth and energy resources;
- protection of the environment;
- see the error message at the bottom of this page for more information;
- The Metrological supply system interacts with the system of ensuring the unity of State measurements of the Republic of Uzbekistan, with the state system of standardization of the Republic of Uzbekistan, with the systems of standardization and certificate-bonding sphere.

The systems of ensuring the unity of measurements of other countries and their interaction with international bodies are regulated in accordance with the current legislation of the Republic of Uzbekistan, the normative documents of the Uzbek Agency of communications and information, the agency "Uzstandard".

Legal and physical persons of the Republic of Uzbekistan, which are guilty of violation of the rules of the metrology, as well as the norms and regulations of the metrology, the bodies of the head of State will be responsible for the documents of the current law.

Administrative-territorial standardization facilities may include norms and rules for managing the territory, ensuring the quality of products specific to the territory.

One of the main tasks of the concept of development and improvement of the national system of ensuring unity of measurements for the period of 2019-2023 is the development of the benchmark base of the Republic of Uzbekistan, the improvement of the Metrological supply of priority directions of development of economic sectors on account of modernization of laboratories of State Metrological In addition, the development of proposals in the field of formation of priority tasks, scientific and technical policy and coordination of works on metrology, consideration of legislative and practical issues of Metrological supply of Uzbekistan economy sectors and making decisions based on them are included in the infrastructure of the concept.

Through the organization of outsourcing services on the issues of Metrological provision of production in the state, consultations on assistance to representatives of small business and private entrepreneurship not provided for by the position of metrologies are provided, equipment and modernization of the technical Park.

The level of Metrological supply directly affects the quality of the product. A special importance is attached to the work of Metrological prophylactics and the issues of Metrological procurement in the preparation of production in the objective of further increasing the effectiveness of this effect. This created a worthy basis for the formation of deeper market relations in our country in due time and increasing the export opportunities of the products produced.

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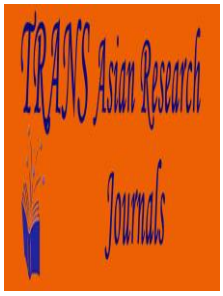

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WIRELESS MESH NETWORKING: IOT-BASEDVIEWPOINT SURVEY OVERRELATED TECHNOLOGIES

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ABSTRACT

The Internet of Things (IoT), being a "network of networks", promises to allow billions of humans and machines to interact with each other. Owing to this rapid growth, the deployment of IoT-oriented networks based on mesh topologies is very attractive, thanks to their scalability and reliability (in the presence of failures). In this paper, we provide a comprehensive survey of the following relevant wireless technologies: IEEE 802.11, Bluetooth, IEEE 802.15.4-oriented, and Sub-GHz-based LoRa. Our goal is to highlight how various communication technologies may be suitable for mesh networking, either providing a native support or being adapted subsequently. Hence, we discuss how these wireless technologies, being either standard or proprietary, can adapt to IoT scenarios (e.g., smart cities and smart agriculture) in which the heterogeneity of the involved devices is a key feature. Finally, we provide reference use cases involving all the analyzed mesh-oriented technologies.

KEYWORDS: *Internet of Things, Mesh Networks, Routing Algorithms, Smart City.*

1. INTRODUCTION

In the current era, the fourth industrial revolution and new generation wireless communication technologies are enabling pervasive connectivity between objects. These communication systems, involved in the so called "network of networks" Internet of Things (IoT), will eventually allow humans to interact with billions of devices, including sensors, actuators, services, and other connected objects, in an Internet-like way, with a forecast of more than 40 billion connected (with short-range radio communication technologies) "things" (and more than 125 billion), and more than 2.7 billion Low Power Wide Area Network (LPWAN) connections[1]. In this context, connected things are generally defined as Smart Objects (SOs) and, thanks to the IoT, dynamically integrated in several scenarios, such as: smart industries applications, smart cities, smart agriculture, smart health, etc.

Each application area has specific requirements to be taken into account, thus having implications for the communication technologies to be considered and, possibly, adopted. In particular, IoT-related wireless technologies developed in recent years are extremely heterogeneous in terms of protocols, performance, reliability, latency, cost effectiveness, and coverage. For instance, some of them are designed for short-range radio communications (e.g., Bluetooth and ZigBee), others are more suitable to cover wide areas with very small bandwidth (e.g., Sub-GHz), while others are designed for middle-range communications and high transmission rate (e.g., IEEE 802.11)[2]. Moreover, IoT network topologies are generally star- or tree-based, with data collected by groups of sensors and sent to a central collector or border router, in order to guarantee centralized processing.

The emerging and constantly evolving IoT applications require more complex network topologies, without a predefined hierarchy but able to dynamically adapt themselves to changing conditions. For this reason, there is a strong academic and industrial interest on the development of hardware and protocols able to support Wireless Mesh Networks (WMNs). In mesh topologies, network nodes are directly and dynamically connected in a non-hierarchical way, thus allowing many-to-many communications (among nodes cooperating with each other) to efficiently route data from a generic source to a generic destination[3]. In fact, in a WMN each node composing the network can operate both as a host and as a router, relaying packets sent by other nodes when the destination is not in the visibility range of the source. Moreover, mesh networks do not require an infrastructure, since they dynamically self-organize and configure themselves, with consequent relevant advantages, in terms of:

- Deployment, installation and maintenance's overhead and cost reduction;
- Dynamic workload distribution;
- Better reaction to node failures; and
- Easy network topology modification.

The organization of a WMN is generally handled through the definition of a routing policy shared among all nodes, aiming at discovering and determining the best routes, on the base of different metrics (e.g., throughput, link quality, hops number, etc.) measured on data streams. Therefore, streams of data in WMNs cross all nodes connecting the source and the destination. Mesh topologies are thus the most attractive alternative to traditional centralized or tree-based network topologies, where nodes are directly linked to small subset of other nodes and the links between these infrastructure neighbors are hierarchically organized[4]. While star- and tree-oriented topologies are very well established, highly standardized and vendor-neutral, in the case of mesh networks the research community and vendors have not yet all agreed on common standards, with the interoperability among devices from different vendors seldom assured. Moreover, comprehensive surveys on available options in the field of mesh networks for IoT are lacking in the literature.

In this paper, we aim at highlighting how a mesh network can be built under heterogeneous communication technologies, thus providing a comprehensive survey of relevant wireless communication technologies which can be employed in different IoT scenarios, namely: IEEE 802.11-based, Bluetooth, IEEE 802.15.4-based, and LoRa. We analyze these protocols from the point of view of their support to mesh networking, either as native applications or by proper

adaptation. To provide a global vision of the state of the art on WMNs, our survey includes both standard and academic/industrial solutions.

1.1.Mesh in IEEE 802.11

In the last decade, a growing interest in mesh networking, from both academic and industrial entities, brought to the definition of an IEEE 802.11 standard amendment[5], specifically addressed to IEEE 802.11 mesh networks, denoted as IEEE 802.11s. The physical layers of IEEE 802.11s and IEEE 802.11 standards are the same: it introduces new routing procedures that are performed at the Medium Access Control (MAC) layer, rather than at the network layer. To have an efficient routing, the nodes must have an accurate knowledge of the wireless links connecting them to their 1-hop neighbors. This leads to a seamless routing for protocols of the higher layer. In an IEEE 802.11s mesh network, also named as Mesh Basic Service Set (MBSS), there are different logical components. The main ones are the mesh stations (mesh STAs) that can participate to the formation of the MBSS, in which each node has the same level of complexity and there is no hierarchical structure. The mesh STAs, moreover, participate to the path selection and forwarding, leading to a very simple self-organizing network.

In case of integration with other type of networks, such as the "traditional" IEEE 802.11 infrastructure BSS, or if the MBSS has to access external networks, other logical components are needed; the one that guarantees the access to the mesh network for "traditional" IEEE 802.11 stations is named as Mesh APs (MAPs). A MAP, however, does not enable the communication between a mesh STA and a non-mesh STA[6]. In fact, the logical component that enables the integration between meshes BSS and infrastructure BSS—thus enabling the communication between mesh STAs and non-mesh STAs—is the mesh gate. Furthermore, in order to enable also the communication between the mesh BSS and non-IEEE 802.11 Local Area Networks (LANs), such as wired LAN, other logical components are used, namely the Mesh Portal Points (MPPs), which enable the communication with some external entities.

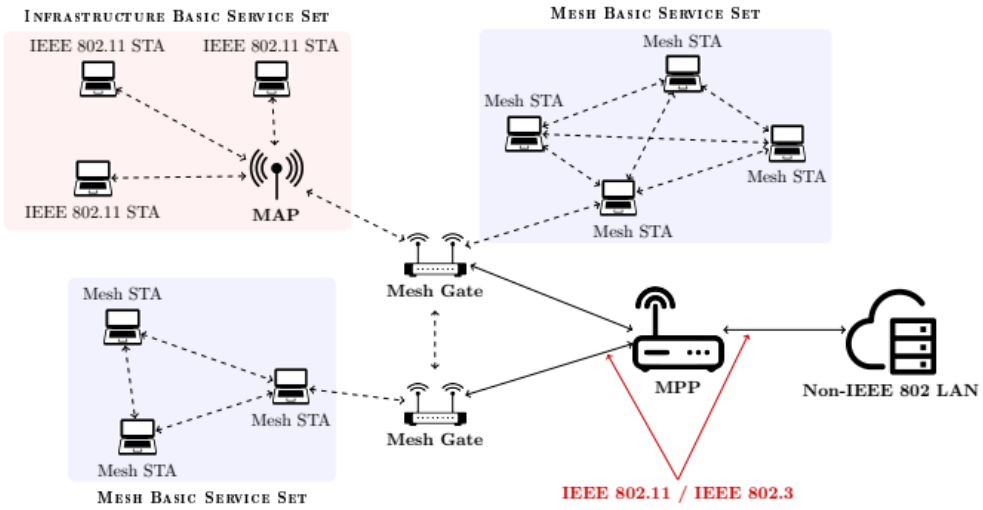

Figure 1. Architecture of MBSS containing mesh STAs, APs and portals as designed in IEEE 802.11s standard

1.2.Mesh in Bluetooth/BLE Networks

Among the different releases of the Bluetooth protocol, the Bluetooth Low Energy (BLE) corresponds to its low-power variant and is a promising technology which allows to build low-power and low-cost networks composed by a large amount of nodes. BLE is presently raising more and more attention and is becoming one of the leading technologies for both IoT-oriented and industrial scenarios. Moreover, the relevance of BLE technology is due to the fact that it can be found as a natively implemented feature in the majority of current devices (e.g., laptops, smartphones, mobile tablets, and other smart devices), thus enabling users to interact with environmental BLE objects without the use of additional gateways[6]. Despite that, most applications developed in last year's focus on different network topologies, either point-to-point or star-based, where the smart device (i.e., a smartphone or another BLE-enabled device) acts as the center of the network. Looking at the technological aspects, BLE may be described as a short-range technology: in order to cover large areas or to allow complex networking behaviors, a multi-hop network is required. Therefore, BLE has recently shown a great attention even for its use as a reference technology to build mesh networks, in order to enable many-to-many communications in network scenarios. Hence, this general interest has led to the definition of a plethora of proprietary BLE-oriented networking solutions that generally lack of interoperability due to missing common mesh standards[7]. A first change happened in 2017 thanks to the release of the official Bluetooth mesh networking standard specifications by the Bluetooth Special Interest Group (SIG). With respect to the original and classical version of the Bluetooth protocol, able to achieve high-speed transmission, the low-power BLE protocol aims at significantly reducing the power consumption of a BLE node itself. Moreover, it is notable that BLE-enabled devices (especially those oriented to IoT) are generally battery-powered (by coin-cell batteries) and should operate for a long time (e.g., several years) with a limited duty cycle without the need for replacing the internal battery.

Similarly, to the classic Bluetooth, BLE uses frequencies in the range of 2402–2480 MHz, thus working in the 2.4 GHz band; at the opposite, BLE is provided with 40 2 MHz-spaced channels. Looking at the operating plane, BLE provides two different communication ways among the devices participating to the communication:

- Advertising mode, in which a BLE node broadcasting packets allows its neighbors (within its transmission range) to receive the transmitted data; and
- Connection-oriented mode, where the packet transmission happens only between two BLE nodes which, through a handshake, establish a direct connection.

Focusing on these modes, in2013 the iBeacon protocol has been announced by Apple with the goal of building applications and services in a location-aware fashion[8].

Hence, in order to mark a BLE advertising packet as an iBeacon message, it has to contain the following information (useful for identifying the specific iBeacon device which sent the iBeacon message):

- A 16-byte Universally Unique IDentifier (UUID), and
- Two 2-byte fields identifying Major and Minor identifiers.

1.3.Mesh Networking with IEEE 802.15.4

One of the most promising emerging technologies for IoT applications is represented by LoRa (and its MAC layer denoted as LoRaWAN). This technology allows long-range communications,

reaching (in optimal propagation conditions) tens of kilometers of distance. The classical topology of a LoRaWAN network is a single-hop star of star topology, as shown in Figure 7a, in which gateways relay messages between end-devices and a Network Server. Gateways are connected to Internet in any available way (e.g., via Wi-Fi, cellular, or Ethernet connections)[9]. Despite the long-range capability between end nodes and gateways, there may be the necessity for multi-hop support, for example if one wants to reach very remote areas, avoiding the deployment of a larger number of gateways which are expensive to deploy and maintain. In this case, the topology of a LoRaWAN network changes in a mesh network, as shown in Figure 7b. Therefore, among the many research activities regarding LoRaWAN, one of the last aspects under investigation is the implementation of routing protocols to bring multi-hop capabilities to LoRaWAN networks. In general, the considered number of hops is limited, due to the intrinsic high coverage capability of LoRa. In [74], the authors propose and evaluate an alternative MAC layer for LoRa (called LoRaBlink) enabling multi-hop communication in a network of battery-powered and duty-cycled devices. In their work, the authors make the assumption that the network is characterized by a low node spatial density, low data traffic, a small number of nodes (i.e., no more than 6), and there is only one sink. The protocol integrates MAC and routing in a single simple protocol. Time synchronization among nodes is used to define slotted channel access. Nodes transmit concurrently within slots and properties of the LoRa PHY layer ensure that only one of the concurrent transmissions is received[10]. Messages are distributed from the sink to nodes using flooding. Messages from nodes to the sink use a direct flooding approach. They use beacons for synchronization and divide the time in epochs. Each epoch contains: NB beacon slots, used to send information about hop distance, and ND data slots, which carry the actual data. The performance of the proposed system has been evaluated in a small scale scenario (the maximum distance at 1 hop is 269 m, while at 2 hops it is about 300 m), and the Packet Delivery Ratio (PDR) is on the order of 80%.

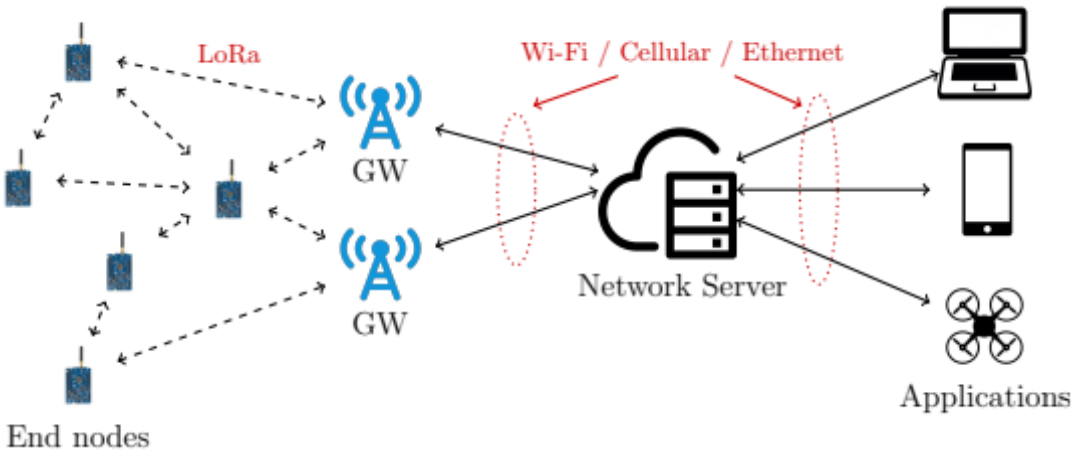

Figure 2: LoRaWAN network topology Mesh topology in LoRaWAN network.

2. DISCUSSION

For the transmission protocols analyzed in Sections 3–6, in the case of a target application where low-rate communications are acceptable, the most suitable mesh protocol that can be adopted is LoRa, due to its long-range capability, battery life and power consumption, even though it requires the presence of a backbone infrastructure, in terms of Network Servers and gateways.

As an alternative, both Thread and Zigbee can be seen as adequate mesh technologies, especially in terms of scalability and power consumption. With the same transmission range there exists also the possibility to adopt the LWMesh protocol, which seems to ensure better performance in terms of data rate, but, with the lack of being proprietary and, thus, available only employing specific hardware devices. Considering instead target applications where a short transmission range is required, another interesting and upcoming mesh technology is represented by BLE, which increases the data rate over that typical of LWMesh and provides good performance in terms of network topology, power consumption and network coverage (even if it requires a large number of connected nodes with respect to other technologies). Finally, the IEEE 802.11 mesh protocol guarantees an acceptable transmission range, with the highest data rate among all considered communication protocols, but with a power consumption higher than other transmission protocols—it is well-known that an IEEE 802.11-based chip require more energy rather than transmission chips based on alternative protocols.

Another remark is that complex systems often require the employment of different and heterogeneous technologies as the ones considered in this survey. Since each solution is characterized by different objectives and data handling policies, in order to integrate data flows across different technologies, it is expedient to define an abstraction middleware placed on top of all the considered stacks. In this way, there is no need to directly modify a predefined protocol stack, but it is sufficient to prepare a "connector" which allows to extract the data arriving through a specific mesh protocol and translate them for the destination mesh protocol. As a final remark, future research works should involve the performance analysis of several mesh networks, each of them composed by a different number of devices and denoted by different network depths. The performance is expected to degrade for increasing values of the network depth.

3. CONCLUSION

In this survey paper, we have analyzed several approaches that can be adopted in scenarios in which mesh networking is attractive/necessary (e.g., IoT-oriented scenarios). On top of this, we have discussed on how mesh networking can be carried out through different wireless technologies, ranging from IEEE 802.11 to Bluetooth (and its lightweight Bluetooth Low Energy (BLE) version), IEEE 802.15.4-oriented protocols (such as Thread, LWMesh, and ZigBee Pro and ZigBee 3.0), till Sub-GHz-based LoRa protocol. We have outlined how some protocols were born with a native support for mesh networking (i.e., being specifically tailored for mesh scenarios), while other communication protocols have been extended to support this type of networking. An interesting conclusion from our survey is that the considered technologies, being either standard as well as proprietary, well adapt to scenarios in which the heterogeneity of devices composing the mesh network is a must, such as IoT environments. In this case, a "network of networks" is the best definition that can be used and that better represents the variety of communications, ranging from short-range to long-range, that can be found in modern scenarios—such as in smart city and smart agriculture scenarios.

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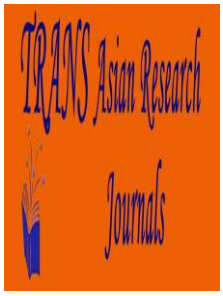

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JAPANESE LANGUAGE REVIEW OF SYNTAX RELATIONSHIP: SCIENTIFIC ANALYSIS

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ABSTRACT

Although Japanese belongs to the Altaic language family, the issue of syntactic relations has always been in the focus of scholars, and this phenomenon has become more widespread since Japan emerged from the "closed" period. Different Japanese scholars have given different descriptions of syntactic relations, among them T.Hideo summed up all the events and noted that the connection of words in a sentence is equal and subordinate. A number of Russian scholars have contributed to the wider coverage of syntactic phenomena in Japanese in other countries. However, in the analysis of Russian scholars, a specific analysis of the grammatical structure of the language in the Romano-Germanic language family is observed.

KEYWORDS: *Syntax, Syntactic Relations; Equal and Subordinate Attitude; Agreement Indicators, Management, M.Kieda Analysis.*

INTRODUCTION

It is known that Japanese and Uzbek languages belong to the same family of languages, the Altaic language family. It has been observed by scholars that the grammatical structure of these two languages, which belong to the same language family, is also almost the same. Although the two languages being compared belong to the same language family, they cannot be said to be the same. After all, Uzbek belongs to the category of Turkic languages, while Japanese is a separate category, not another.

The issue of syntactic relations is one of the most comprehensively analyzed issues in linguistics. This issue is widely covered in both Japanese and Uzbek. In Japanese it is called a syntactic relationship 統語的関係(tougoteki kankei). Many Japanese linguists have conducted a number of studies on the interrelationships of words in speech and the syntactic nature of the means involved in them, and they have differed in their views.

Until the 1950s, the role of form was paramount in the interconnection of words, with content declining. However, in a sentence, both the form and the content must be in equal proportions. M. Shizuo referred to auxiliaries and auxiliary verbs as morphemes in the connection of words.

THE MAIN FINDINGS AND RESULTS

M. Kieda, a Japanese linguist, argues that in order to study the concept of speech, it is necessary to begin with the study of how words relate to each other. He makes a comparative analysis of the speech of linguists such as F. Otsuki, Hashimoto, Mitsuya, and draws general conclusions. In M. Kieda's speech, there are two conditions: in terms of form, which means the interconnection of words, and in terms of content, that is, it means the expression of a complete idea. Linguist divides words into equal (並立) and descriptive (managerial) and prepositional relations, depending on the relationship between them. According to him, if the word is a building material, then the word is a building. He also admits that the word is not used outside the sentence. Kieda's views have also been praised by Japanese scholars. Thus, it can be seen that during this period, Japanese linguistics paid special attention to the definition of speech.

T. Hideo was one of the first in his book Volume III on the syntax of the Japanese language to analyze the relationship between words in a sentence as equal (並立結合) and subordinate (主従結合) and which system of syntactic means of communication. In it, he reveals the peculiarities that exist in the interconnection of words in Japanese. For example, in expressing an equal relationship between words, not only the conjunctions, but also the word itself in the same category undergoes a form change, as well as a single equal conjunction, such as a noun, a verb, an adjective. Cannot link words belonging to a word group. In Japanese, he points out that there are different means (auxiliary words) that connect words in a sentence, such as nouns, adjectives, and verbs.

K. Chisato and a number of linguists grouped the indicators and auxiliaries into 助詞 group and cited their place in the sentence. In this case, the main indicators of the agreement are mixed with the auxiliaries, but their differences are revealed.

It is commendable that Sh.Moriyama conducted research on the practical application of the morphological tool−agreement (格助詞) in the educational process by revealing the semantic aspect of cognitive linguistics and analyzing it on three indicators of agreement.

It should also be noted that a number of scientific studies have been published on each of the means of expressing the syntactic relationship. For example, I. Shoji in his article explains the syntactic feature of the consonant index “に” in Japanese on the basis of Hobunka's views, and also explains the auxiliaries that come with “に”. Of particular interest was M. Shegel's introduction of the 句– ku year-old hierarchical system in English, and V. Ribin's research on the substitution of intonation in Japanese speech.

Although a number of studies have been conducted on the syntax of the Japanese language, the means of syntactic communication have not been presented in their entirety in the studied sources. As mentioned above, Japanese is one of the agglutinative languages, so it is rich in affixes.

Well-known Japanese scholar V.Alpatov in his book on the theoretical study of the Japanese language in the team used syntactic means in the interconnection of words in the Japanese language: ; b) There are types of verbs that are related to a group of words (auxiliary words,

auxiliary verbs). He also briefly explained their place in the speech. However, he did not include word order or tone in this group. In this scientific work, the analysis was made taking into account Alpatov's views.

B.Lavrentev is more focused on practical grammar. He was one of the first to try to name consonants in Japanese based on Russian grammar, as well as auxiliary words and their syntactic functions. Although he has studied syntactic tools in practice, his contribution to the naming of consonant types is cited as an important source in our research.

It should be noted that the types of agreements in Japanese are not named. Sources only provide agreement data. The function of the contraction indicators in a sentence is determined by the context.

V. Golovnin begins to put the means of syntactic relations in a system of separate affixes and names all of them in Russian in different terms with the terms available in linguistics, for example, describes the conjunctions as “gaonyms”. The system also divides the auxiliary words into subgroups, giving the semantics of the words represented by the auxiliary words. The services of V.Ribin, V.Kutafyeva and her students in this field are also very important.

Theoretical research of Japanese scholars allows for a comparative study of the means of word association in Japanese with Uzbek.Because their research is an important source of information for Japanese language professionals.

CONCLUSION

Regarding the syntactic relationship in Japanese, it can be concluded that affixes play an important role in the interconnection of words, as Japanese is a grammatically agglutinative language. The issue of syntactic relations is a well-studied phenomenon in Japanese linguistics, although the means of expressing syntactic relations are not fully described in various sources. In the early years, the syntactic relationship took precedence over form, while content took second place. A number of Japanese scholars have also made significant contributions to the study of syntactic phenomena.

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METHODS OF USING INFORMATION ABOUT THE ART OF MUSIC IN TEACHING HISTORY TO STUDENTS OF 9TH AND 10TH GRADES OF SECONDARY SCHOOLS

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ABSTRACT

This article describes the methods of providing information on music and singing to 9th and 10th grade students of secondary schools, as well as suggestions and recommendations for additional information on this topic. In addition to human labor, effective recreation also plays an important role. Of course, in the process of recreation, a person feels the need for music. For this reason, humankind has regularly created music and folk songs since ancient times. In general, the art of music and singing has become an integral part of human life. The Uzbek people also have a great tradition and experience in this area.

KEYWORDS: *Music, Troupe, Musical Instrument, Style, Song, Composer, Conservatory, Note, Lesson, Lesson, Exhibition, Tradition.*

INTRODUCTION

One of the important aspects of human history is the history of cultural life. This is because man, in the course of his conscious activity, rises in the midst of such processes as reading, learning, and gaining experience.

In addition to human labor, effective recreation also plays an important role. Of course, in the process of recreation, a person feels the need for music. For this reason, humankind has regularly created music and folk songs since ancient times. In general, the art of music and singing has become an integral part of human life. The Uzbek people also have a great tradition and experience in this area. Holidays, festivals, weddings, songs and music of the Uzbek people have not passed. Musicians, singers, bakhshi-poets, hafiz, who grew up among the people, have been in the service of the people on all festive days and have contributed to the cultural recreation of the people. Therefore, the effectiveness of history lessons in teaching the history of Uzbekistan in secondary schools can be achieved by linking the history of music with the history of cultural life during the lessons. It is possible to work in small groups, organize small quizzes, watch

documentaries on music and singing outside of class hours, prepare an album under the auspices of Uzbek musical figures. In addition, it is possible to determine the knowledge and skills of students by creating crossword puzzles on topics such as "Uzbek classical melodies", "Uzbek musical instruments", "Uzbek composers", "Uzbek folk songs", "Uzbek singers", "Uzbek musicians". It is also possible easily convey Uzbek musical genres to students through the method of fish skeleton. Through the pyramid method, it is possible to gradually study the periods of historical formation and rise of Uzbek musical culture. When explaining the topic "Uzbek theater and music in the late XIX and early XX centuries" to 9th grade students, it is advisable to explain the musical instruments in categories.

For example:

A) Stringed bowed instruments - gijjak, kobiz, uchtor

C) Stringed instruments - rubob, drum, dutar, tanbur, ud

C) Percussion stringed instrument - dust

D) Puffing instrument - nay, trumpet

E) Trumpet - blower

G) Percussion membrane instrument - circle, drum, chindovul [1].

It would also be useful to show that both soloists and ensemble performances developed in the musical culture of Turkestan at that time. At the same time, the teacher explains to the students that musical instruments are categorized based on the possibility of performing at public parties, chamber (room) and concert (round). It is useful to explain this classification in the table below.

1	Musical instruments designed to be a chorus at traditional festivals, public performances and weddings.	Speakers, drums, circles (loud resonant musical instruments)
2	Instruments for chamber (room) and concert (round) performances	Trumpet, dutar, gijjak, tanbur, chang, setor, nay, (some low-pitched musical instruments)

In explaining to students the development of music in the XIX and early XX centuries, it is useful to explain the existence of Fergana, Bukhara, and Khorezmmaqom and music schools. In addition, the Khorezm School of maqom and music developed during the reign of Khiva khan Muhammad Rahimkhan II (Feruz), in particular, by reading an excerpt from his decree in 1882 declaring Khorezmmaqoms as the inviolable property of the people [2].

The history of socio-economic and cultural processes that took place in Uzbekistan during the dictatorial Soviet system is studied in the 10th grade of secondary schools. There is no doubt that music and the art of singing played an important role in the cultural life of this period. The teacher should explain to the students that the development of the cultural life of the republic in the Soviet era had serious negative affect by communist ideology and dictatorial regimes, nevertheless due to the relentless pursuit of Uzbek intellectuals and cultural figures.

Especially, in the vocal and dance art of Uzbekistan in the 20-30s of the XX century Halima Nosirova, Karim Zokirov, MuhiddinQoriYakubov, BobarahimMirzaev, LutfikhanimSarimsakova, Tamarahonim, MukarramaTurgunbaeva. In addition to noting the high skill of many other art masters fragments of melodies and songs sung by these artists can be released, which are preserved in the golden fund of the art of singing. He also noted that the opening of the Tashkent State Conservatory in 1936, and the opening of the Opera and Ballet Theater in the capital in 1939 was an important event in the cultural life of the republic [3]. It is recommended to watch a documentary with students outside the classroom, which includes songs and melodies sung by artists who took part in the construction of the "Big Fergana Canal", which is a great courage of the Uzbek people. Students' knowledge of the subject can be assessed through methods such as test questions, crossword puzzles, questionnaires. It is possible to expand the knowledge and skills of students on this topic by providing some additional information about the state of Uzbek music and singing in the Soviet era, which is not described in school textbooks. For example, MuhiddinQoriYakubov founded the first Uzbek School of folk music, the first Uzbek musical theater was established in 1926, and the Institute of Music and Choreography was opened in Samarkand in 1928 to study Uzbek national art [4]. During the Second World War, when Uzbek artists were divided into 30 concert brigades, giving 35,000 concerts to soldiers at the front and 26,000 to hospitals, the teacher can refer to social networks and present to the students' attention, as evidence of his opinion, tablets dedicated to the rest of the soldiers during the war. [5]. H.Nosirova, G.Rahimova, K.Zokirov, M.QoriYakubov, M.Turgunbaeva and others were among the artists who worked in the concert brigades during the war. It is worthwhile to dwell on the activities of artists who played an important role in the development of traditional Uzbek singing and music in the postwar years. In particular, the contribution of M. Burkhanov, D. Zokirov, S. Yudakov, Yu. Rajabiy, K. Otaniyizov, and B. Zokirov's to Uzbek music and singing arts can be further enhanced through the broadcasting of audio recordings of their songs. Teacher should explain the students that YunusRajabi alone created more than 100 songs; KomiljonOtaniyozov as a famous singer, musician and composer created a unique school where he was the artistic director of the Khorezm Song and Dance Ensemble (now "Lazgi") under the Uzbekistan State Philharmonic School. BotirZokirov, on the other hand, founded modern Uzbek professional pop music. This should serve as a provident, that Uzbek music and singing had not stopped despite the hardships of the Soviet era [6].

Here we can focus on the work of the teacher BotirZokirov in popularizing Uzbek pop art in the world. For example, important facts, such as awarding the song "Uzbekistan is my Homeland" performed by BotirZakirov and his sister LuizaZakirova at the International Student Festival in Moscow in 1957. Performing the song "Arabic Tango" which was composed by famous Arab composer Farid al-Atrosh during the Week of Uzbek Literature and Art in Moscow in 1959 should be take into consideration. Then people all over the USSR sang this song. In 1960, BotirZakirov sang twice on the stage of the Olympic Theater in Paris. In order to substantiate the attitude of the communist ideology and Soviet power to the Uzbek musical art based on the great state chauvinism in 1951 on the instructions of the center with the participation of representatives of the republican art the issue of "The state of music in Uzbekistan and measures for its further development" was discussed. However, the decision on this issue, focused on the priority development of Russian and Soviet music in the country. As a result, traditional music and the art of singing had been severely damaged, but the content of music and songs created in the new spirit was disproportionate, which did not correspond to the national spirit, and such works could not meet the needs of the people. [8].

In explaining the processes associated with cultural life in the 60s and 80s of the twentieth century, one can also focus on areas related to the art of teaching and music and singing.

In particular, during this period in the republic were formed folk dance ensembles "Lazgi", "Shodlik", "Gozal", "Bahor", vocal and instrumental ensembles "Yalla", especially "Yalla" became one of the most popular ensembles in the USSR. The song "Three Wells" will make the lesson livelier, noting that "Song-81" has reached the finals of the All-Union Television Song Contest and the song has become a popular hit of its time [9].

In conclusion, the provision of information on music in the teaching of history of Uzbekistan to 9th and 10th grades of secondary schools will further increase the spiritual level of students. It also provides an opportunity to use new innovative and pedagogical technologies in the classroom by providing students with relevant information in the form of videos, multimedia and audio formats.

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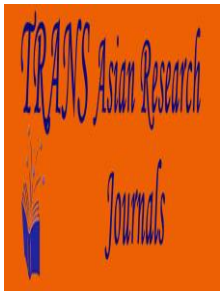

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WAYS TO PROVIDE EMPLOYMENT OF THE PEOPLE'S (ON THE EXAMPLE OF THE REPUBLIC OF UZBEKISTAN)

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ABSTRACT

This article describes in detail the directions of employment, the factors of unemployment. The employment and unemployment rate in the Republic of Uzbekistan, the dynamics of their change and employment are analyzed by industry. Proposals have also been developed to ensure employment and reduce unemployment.

KEYWORDS: *Employment, Labor Resources, Unemployment, Jobs, Labor Migrant, Self-Employment.*

INTRODUCTION

Today, reforms and global projects are being implemented in any country to ensure employment. In particular, the International Labor Organization supports the technical, organizational and institutional capacity of countries around the world to ensure sustainable employment.

Among the countries withdrawing from the global pandemic, Uzbekistan is experiencing a decline in unemployment caused by the pandemic in 2020, and existing jobs are being restored. However, employment has not returned to pre-pandemic levels. The main reason for this is related to external migration.

According to the Ministry of Employment and Labor Relations, today the number of labor migrants working in other countries in our country is 2.6 million. This figure is 7.5% of the total population and 13.6% of the total labor force. Due to the closure of many jobs and difficult living conditions during the pandemic, most labor migrants returned to our country. This has led to rising unemployment and declining incomes.

Therefore, at the initiative of the head of our state, consistent measures are being taken to create new jobs by stimulating active entrepreneurship, improving the investment climate and business

environment. In particular, the Resolution of the President of the Republic of Uzbekistan dated July 14, 2018 No PP-3856 "On measures to improve and increase the efficiency of work to ensure employment" [1]. In addition, the country is taking effective measures to implement the approved annual programs to ensure employment, improve the mechanisms of employment in vacancies and quotas, the development of effective forms of self-employment.

However, the labor market in the regions is still highly tense, the creation of permanent jobs, employment of young people, women, members of low-income families, especially in rural areas, as well as the regulation of external labor migration remain unresolved. This shows how relevant the topic is and the need for research in this area.

Analysis of the literature

Employment has always been one of the most pressing issues. Especially in the context of the global pandemic, the issue of employment has once again shown to be a global problem and requires more scientific research in this regard. Including:

From foreign scholars, B.D. on solutions to existing problems in providing employment to the population. Breev [2], V.N. on informal employment and its impact on public finances. Salin and V.V. Narbuts [3], E.A. on Statistical Analysis of Employment and Unemployment. Dolgix [4], C. Krittanawong, A. Kumar, Z. Wang, U. Baber, and D.L. on the risk of cardiovascular disease as a result of self-employment and long labor. Bhatt [5], P.Ge, W.Sun and Z.Zhao [6] on the impact of demographic changes on employment [6] and J. Grashuis on the analysis of the duration and competitiveness of self-employment during the COVID-19 pandemic [7]. are conducting research.

Nasimov, D.A. from local scholars [8] to improve the methodological and methodological framework for the introduction of modern forms of employment in the digital economy, M.K. Abdullaev and D.B. Begalova [9] conducted an analysis of employment indicators in our country, S.A. Bozorova [10] described the state of the service sector in increasing the employment of the population, A.B. Irmatova [11] on the problems of women's intellectual labor, A. Tashpulatov [12] and Sh.R. Xolmuminov, B.X. Umurzakov, T.A. The Mahmudovs [13] have been studying the strategic socio-economic importance of reducing the employment of the rural population and their informal employment.

The results of these studies, in addition to their scientifically based proposals, practical recommendations and conclusions, provide a further scientific study of the organizational, economic and institutional aspects of solving the existing problems of employment and statistical analysis. as well as the development of innovative approaches.

Research methodology

In this study, expert evaluation, comparison, comparative analysis and systematic approach, statistical tables and graphs and diagrams, as well as official statistics of the International Labor Organization, the State Statistics Committee of the Republic of Uzbekistan, the Ministry of Employment and Labor Relations and local and foreign scientists. research work has been widely used.

Analysis and results

International labor migration is expanding due to the integration of economies and the development of interstate socio-economic, strategic ties, as well as countries with stable or low population growth due to low birth rates (European countries, Russia, South Korea, etc.).

This process benefits every state. That is, if labor migrants contribute to the growth and development of the countries they go to, remittances and the experience they gain will greatly benefit their countries.

However, the management of the migration process, the protection of labor migrants, the regulation of migration and development relations, and international cooperation are among the most complex issues.

In countries with high population growth rates and most developing and underdeveloped countries, there are sufficient employment problems. These include, for example, lack of jobs, low wages, lack of professional skills and knowledge of the workforce.

There are five main causes of unemployment in the economy:

- Other structural changes in the economy associated with the introduction of new technologies;

- Economic downturn leading to a decline in demand for labor resources;

- Public policy, increase in the minimum wage and therefore decrease in demand for labor;

- Seasonal fluctuations in some sectors of the economy;

- Demographic change, ie the growth of the working age population.

Today, practical measures are being taken in our country to ensure employment. These include increasing employment through the full support of entrepreneurship and small business, family entrepreneurship and self-employment, as well as the creation of new jobs through the creation of favorable conditions for their development.

As of January 2021, the population of our country is 34.6 million. 17.5 million of them. in cities and 17.1 mln. one lives in rural areas.

The population density is 77,000 people per square kilometer in the country. However, the distribution of the population varies sharply by region, in particular, in the Republic of Karakalpakstan there are 11.5 thousand people per 1 sq. Km, in Andijan - 741.4 thousand, in Bukhara - 48.4 thousand, in Jizzakh - 66.5 thousand, in Kashkadarya - 116.7 thousand. 9.1 thousand in Navoi, 385.4 thousand in Namangan, 235.4 thousand in Samarkand, 133.4 thousand in Surkhandarya, 201.2 thousand in Syrdarya, 196.3 thousand in Tashkent, 565.1 thousand in Fergana, 312.9 thousand in Khorezm and in Tashkent. and 7874.1 thousand people. This indicates the strength of internal labor migration across regions with different levels of socio-economic development.

According to the analysis, the number of labor resources in the country is 19.1 million. people, which is 55.9 percent of the permanent population. Of the total labor resources, 19.01 mln. 0.9 million people, or 99.5% of the working age population. or 0.5 percent of workers younger and older than working age (Table 1).

TABLE 1**DYNAMICS OF LABOR FORCE STRUCTURE IN THE REPUBLIC OF UZBEKISTAN(THOUSAND PEOPLE)**

Structure of labor resources	**2004**	**2008**	**2012**	**2016**	**2020**
Labor resources	14048,8	15685,7	17564,3	18488,9	19142,3
as a percentage of the permanent population	54,3	57,5	59,0	58,1	55,9
including:					
Able-bodied population of working age	13880,4	15474,6	17451,5	18371,7	19052,0
as a percentage of the permanent population	53,7	56,7	58,6	57,7	55,7
as a percentage of labor resources	98,8	98,7	99,4	99,4	99,5
Workers younger and older than working age	168,4	211,1	112,8	117,2	95,1
as a percentage of the permanent population	0,6	0,8	0,4	0,4	0,3
as a percentage of labor resources	1,2	1,3	0,6	0,6	0,5

Source: Data of the State Statistics Committee of the Republic of Uzbekistan.

77.3% or 14.8 mln. one of them is the economically active population. In addition, 13.2 mln. people or 69.2% of the labor force are employed in the economy.

According to the analysis, by 2020, the employed population will reach 3.6 million. or 26.9 percent in agriculture, forestry and fisheries, 1.8 million. or 13.5 percent in industry, 1.3 million. or 9.6 percent construction, 1.4 million. or 10.3 percent of sales, 0.6 million. or 4.7 percent of transportation and storage, 1.1 million. or 8.8 percent education, 0.7 million. health care and social services, or 4.9 percent. or 21.3 percent of other activities (Figure 1).

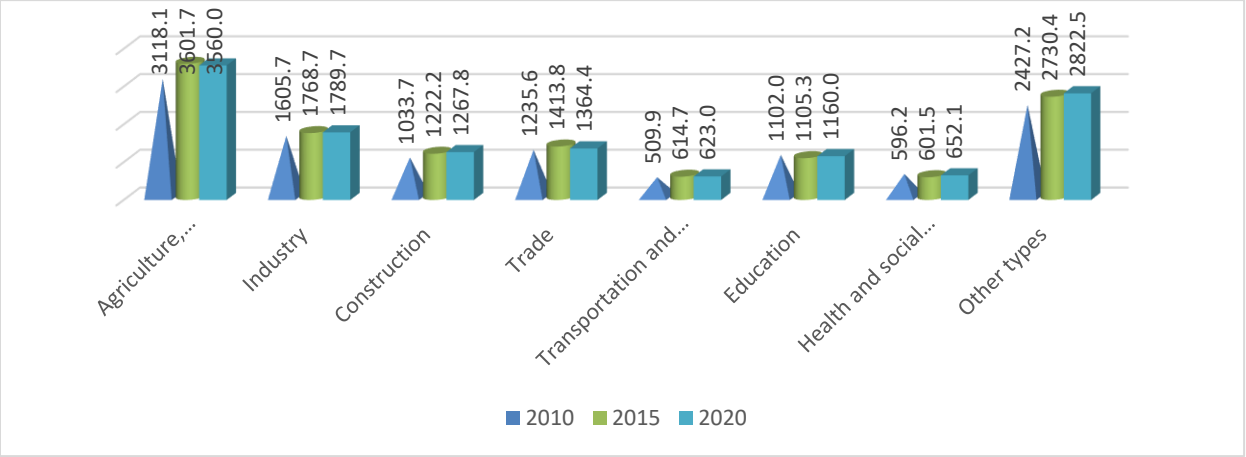

Figure 1. Structure of the employed population by type of economic activity (thousand people).

Source: Data of the State Statistics Committee of the Republic of Uzbekistan.

The analysis shows that in 2020, the employment rate increased by 113.9% compared to 2010 and 101.4% compared to 2015, while by type of economic activity, agriculture, forestry and fisheries increased by 114.2% and 98.8%, respectively, industry 111.5 and 101.2 percent,

construction 122.6 and 103.7 percent, trade 110.4 and 96.5 percent, transportation and storage 122.2 and 101.4 percent, education 105.3 and 104.9 percent, respectively. , health and social services by 109.4 and 108.4 percent, and other activities by 116.3 and 103.4 percent, respectively.

Also, according to the analysis of the types of ownership of the employed population, in 2020 the number of employed in the public sector will reach 2.5 million. and 10.7 million in the private sector. formed a person. In recent years, the number of people employed in the public sector is increasing. In particular, the growth rate of banking in the public sector in 2012 (compared to 2010) was 98.0%, in 2014 (compared to 2012) was 98.4%, in 2016 (compared to 2014) was 100.2%, in 2018 (compared to 2016) 104.1 percent, an increase of 102.9 percent in 2020 (compared to 2018).

As of January 2021, the number of registered unemployed in the country amounted to 37.1 thousand people. Compared to 2010, this figure increased by almost 2.3 times, its growth rate was 0.4% in 2000, 0.4% in 2004, 4.9% in 2008, 4.9% in 2012 and 5.2% in 2016. and 110.5 percent in 2020 (Figure 3).

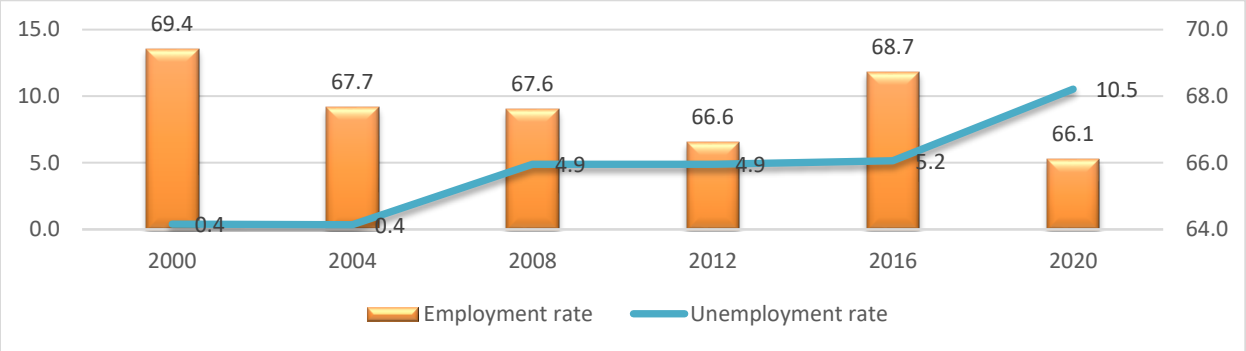

Figure 3. Rate of employment and unemployment (percentage).

Source: Data of the State Statistics Committee of the Republic of Uzbekistan.

The employment rate in the country compared to the working age population in 2000-2020 averaged 67.7%. In particular, it was 69.4 percent in 2000, 67.7 percent in 2004, 67.6 percent in 2008, 66.6 percent in 2012, 68.7 percent in 2016, and 66.1 percent in 2020.

Conclusions and suggestions

Based on the above, it is expedient to take into account the following in order to ensure employment and reduce unemployment in our country:

1. It is necessary to thoroughly analyze the problems of increasing employment from the bottom up and develop practical solutions and monitor their implementation.
2. In general, the shadow economy plays an important role in reducing unemployment. Therefore, the fight against the shadow economy should be organized not through bureaucratic means, but through the application of economic incentives.
3. In parallel with the demographic changes of the population, it is necessary to create new jobs and use the experience of developed countries in this regard.

4. In the process of digitization of the economy, the resulting unemployment rate will be higher than for emerging professions. Therefore, it is necessary to increase the number of low-skilled jobs in the public and private sectors, in particular, to further encourage self-employment.
5. Today, the database on vacancies is based on a number of online platforms among the non-governmental sectors. However, there is very little information on vacancies on public sector websites and most recruitment processes are closed and narrow. This has a negative impact not only on employment, but also on the productivity of these agencies. Therefore, it is necessary to create a single online platform with complete information on vacancies in the public and private sectors.
6. It is necessary to expand the activities of state and non-state agencies and strengthen control over those in need of social protection and those who have difficulty finding employment.

In conclusion, it should be noted that, first of all, it is necessary to provide the population with real and correct treatment. This will serve to increase the effectiveness of the results of analysis and research on population change and employment. It will also allow for the real development of promising strategies to ensure employment, reduce unemployment and improve living conditions. In general, the use of decent wage rates in the creation of new jobs not only has a positive impact on labor productivity, but also leads to an increase in socio-economic development.

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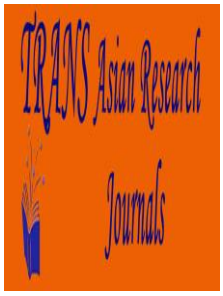

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USE OF SEMANTIC WEB TECHNOLOGIES TO INTEGRATE BIG DATA

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ABSTRACT

Applications will have to address the integration of numerous diverse data sources in order to achieve the promise of Big Data. This activity poses a variety of problems due to data heterogeneity, which may not be fully addressed by existing Extract-Transform-Load (ETL)-based frameworks. The potential of Semantic Web Technologies as a way of integrating and developing Big Data applications is explored in this article. A use case study investigating supplier chain activities is given as an example. We also go through the general problems of data integration in this area. Big Data concept of variety is a broadening of semantic heterogeneity as researched in databases, artificial intelligence, the semantic web, and cognitive science. To reach the aim of extracting maximum value from Big Data collections, one must have the ability to swiftly define and execute strategies across extraordinarily massive data sets.

KEYWORDS: *Big Data, Extract-Transform-Load,Ontologies, Semantics Web,Web Technologies.*

52. INTRODUCTION

Researchers now spend more time extracting, reformatting, and integrating data for analytics than actually doing the analysis. Each analytics tool often requires data to be in a certain format, which necessitates a series of cleaning, normalization, reformatting, and integration steps. The processing of data at the terabyte and above levels aggravates this process even more[1].While there are a several definitions for Big Data, there isn't one that everyone agrees on. The volume dimension has been strongly emphasised, despite the fact that it has been defined by a number of

V's (volume, velocity, variety, and veracity)[2]. Variety has long been a popular feature in Big Data due of data heterogeneity. The task of extracting value from a Big Data collection is intriguing. In such instances, there are several options for using external data to enhance value creation. Due to a number of factors, such as data heterogeneity, schema and ontology isolation, context interdependence across knowledge collections, and knowledge provenance, the term variety takes on even more significance.

As a result of the popularity of Big Data, analytics researchers and corporate IT have gathered a number of new data sources. As a result, organizations are looking for answers to their Big Data problems outside of traditional databases. ETL has been provided in several situations to justify essential changes. The present toolkits, on the other hand, have not yet evolved to accommodate the complexity of Big Data. Consideration of Semantic Web technologies, in our opinion, can considerably help in this field.

The technologies required to facilitate Big Data integration are discussed in this article. We propose, in particular, that Industrial Ontologies be used to facilitate the linkages across diverse data sources. The knowledge processing with Big Data and Semantic Web technologies is depicted in Fig. 1. Inference methods over these ontologies are used to facilitate the identification of linkages in this application. The inference activity, we believe, may be seen as an iterative process that supports the creation and subsequent implementation of heuristics. As a result, a data strategy to enable continuous data integration may be linked to this. We discuss previous research in this area in the next section, and then we provide our case study in the third section. Our conclusion is presented in Section Four.

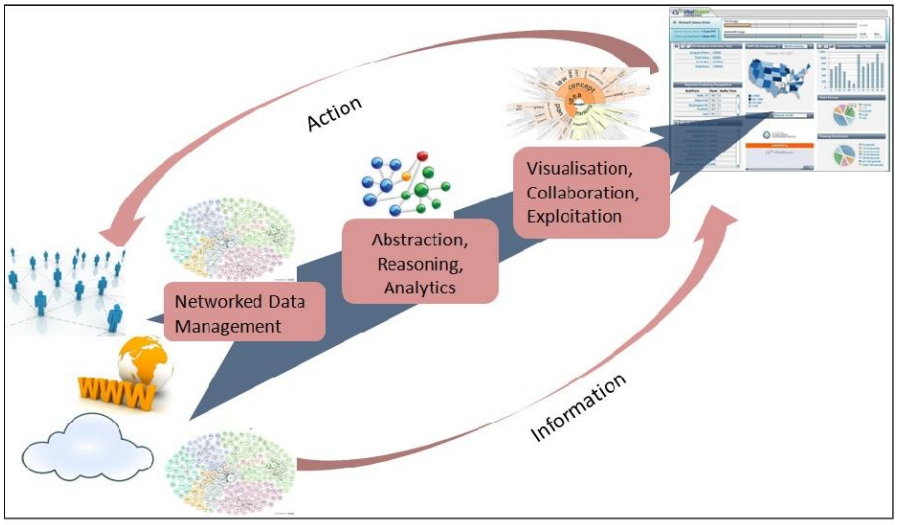

Fig. 1: Illustrates Knowledge Processing with Big Data and Semantic Web Technologies.[3]**.**

53. LITRATURE REVIEW

In the field of ontologies, a lot of study has been done. Noy and Hafner investigated a framework for comparing ontologies as part of their study[4]. They analyzed features across chosen ontologies, including design process, taxonomy, concept structure, axioms, inference methods, applications, and contributions, in order to identify the requirement for reusability. D'Aquin and Noy analyzed eleven ontology libraries' characteristics, content, volume, search methods, possible application exploitation, and technical infrastructures [5].

In the integration of Big Data, semantics has played a significant role. Knoblock and Szekely, for example, mapped a number of data sources (expressed in XML, KML, JSON structured text files, or databases) into a shared domain ontology that enabled data integration, reasoning, and processing[6]. Pasquier demonstrated that as Semantic Web Technologies evolve, they may be used to the construction of big applications by using a test case of biological data integration[7].

Brank et al. investigated state-of-the-art ontology assessment approaches, categorizing them into layers like lexical, syntactic, and structural[8]. The necessity for a common nomenclature in the ontology community was addressed by Flouris et al. They conducted research into ontology change and developed a standard nomenclature[9].

Ahmed et al. aim to concentrate on the consequences of combining Big Data with Semantic Web, how Semantic Web makes Big Data wiser, examine the Big Data and Semantic Web problems and possibilities, and the link between them, before concluding with the integration's future path [10]. Large and complicated quantities of data have been produced in recent years, making standard data processing systems challenging to handle. The introduction of the Internet resulted in a massive increase in the amount of information created and made available. The Semantic Web was disseminated by the World Wide Web Consortium W3C, an international standards authority for the web. It's a more advanced version of the existing web that makes it simpler to find, reuse, combine, and distribute information.

54. DISCUSSION

54.1. Use Case- Supply Chain Risk Detection:

Our use case scenario was created with the goal of utilizing a variety of data sources to aid in the discovery of scenarios that would minimize risk mitigation. The term "risk" may be defined in our case study as a product of impact and probability, where impact is the potential harm that an unpleasant event might do and probability is the likelihood of the event occurring. It is proportional to the number of mitigation plans that may be implemented in an indirect manner. Honda, for example, warned in 2011 that catastrophic floods in Thailand had resulted in a lack of parts, putting the company's operations in jeopardy. They had to halve their output for Canada and the United States, resulting in a massive drop in earnings. Volkswagen's East Coast shipments were also delayed in 2015 owing to a heavy blizzard and cold weather.

Weather isn't the only issue impacting production and shipping; Honda's output has also been hampered by labor problems at West Coast ports. Political events can also have an impact on production, as was the case in the early 2000s in the United States, when tariffs were imposed to safeguard workers in western Pennsylvania, a key swing area in the 2004 election [Wikipedia]. Prior to the tariffs taking effect, US automakers with institutional memory began stockpiling steel. Steel prices rose as a result of this action, providing those who stockpiled early an edge. In this situation, qualitative historical risk analysis proved to be a significant advantage.

Both qualitative and quantitative risk assessment approaches are available. Risk may be viewed as a function of both possible loss and the chance of a loss in a quantitative evaluation. A model of acceptable risk, defined as the amount of risk a company is prepared to take, is also required. This is typically a cost vs. risk connection that is based on the diversity provided by the company's complete portfolio of investments.

To conclude, risk in the automobile sector may arise from a variety of places:

i. Political:

Politics may have an influence on a country's business climate and prosperity. This risk might be "macro", affecting all businesses, or "micro", affecting only a few industries or firms.

ii. Financial:

Fiscal statistics and economic indicators that might point to a supplier's potential difficulties;

iii. Single Source:

For a certain material or component, sole source providers pose a significant risk. Due to a lack of alternatives, a disruption at a single source provider may disrupt the supply chain.

iv. Supplier Organization Risk:

Production might be impacted by problems with a certain supplier. Management changes, labor concerns, mergers, and other challenges may be among them.

v. Nature:

Natural disasters including hurricanes, tsunamis, earthquakes, and other meteorological phenomena may create havoc. Suppliers who are located in locations that are vulnerable to specific risks must be identified.

The importance of various sorts of risks is determined by their impact on the business. Severe weather hazards are the most hardest to plan for since they can strike without warning and cause significant business interruption. Other hazards may arise over time; nevertheless, all of these risks can have a significant impact on the firm and must be anticipated.

In our use case, we explore several ontologies and build namespaces to improve supply chain risk management in an automotive context, as shown in Table 1.

TABLE 1: ILLUSTRATES VARIOUS ONTOLOGIES AND NAMESPACE[11]**.**

1	Automotive	http://purl.org/vvo/ns#
2	Weather	http://www.scs.ryerson.ca/~bgajdero/msc_thesis/code/ontologies/weather-ont-t2.owl
3	Geo Positioning	http://www.w3.org/2003/01/geo/wgs84_po#
4	Postal Code	http://schema.org/PostalAddress#
5	Good Relations Vocabulary	http://purl.org/goodrelations/v1#

We provided more location data for the dealers, including street address, zip code, latitude and longitude, to enable the federation of weather information. Latitude and longitude data may be supplied to dealers using the Geo Positioning Ontology described above. Figure 1 displays an Allegro Graph [20] query for displaying a dealer's geo-spatial position. Dealer names (commercial and legal) are presented, as well as geo-spatial data such as zip code, street location, latitude and longitude.

Using the Weather ontology supplied above, we also incorporated weather information for dealers. The ontologies of Weather and Vehicle Sales correspond to geospatial data such as

latitude and longitude. Wind speed, wind direction, visibility, temperature, pressure, humidity, latitude, and longitude are all part of the weather ontology.

The two ontologies, Vehicle Sales and Weather, were then federated in Allegro Graph. We were able to obtain dealers with specified weather conditions using a SPARQL query against our federated ontology, where the geo-spatial information of dealers is supplied. The federation of automotive ontologies and climate ontologies could be a technique for effectively predicting any dangerous weather events such as natural disasters which might impede or delay the production process or sales in the automotive domain, depending on the location of the dealers or manufacturing plants/facilities. For example, forecasting meteorological conditions such as a snowstorm, which may be devastating for car and component manufacturers' sales. Here, such businesses may plan ahead of time how they will compensate for a loss of revenue and/or output before it happens. In Fig. 2 example sparql query over federated ontology.

Through the process of ontology federation, our use case may be broadened to deal with different sorts of hazards. Data quality concerns, on the other hand, must be explored and rectified. Many industrial data sources have inaccuracies and omissions. To assist detect and clean up erroneous data, a variety of approaches can be used.

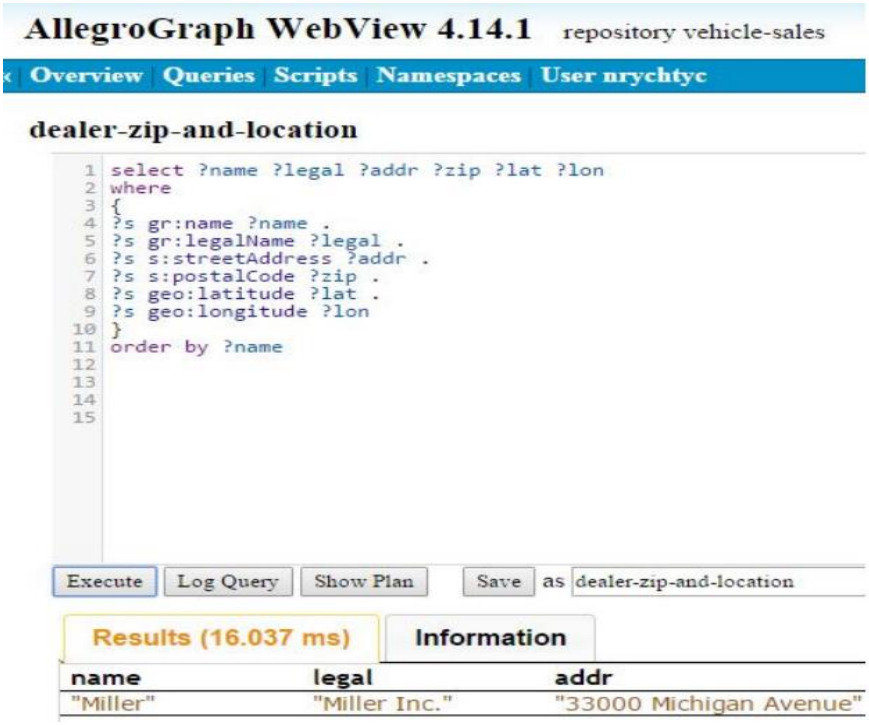

Fig. 2: Example SPARQL query over federated ontology[11]**.**

Although technologies for "Data Cleaning" are available, proper use of these techniques still need domain expertise of the data. It is critical to comprehend the data models and context. Finding the right link between components and materials necessitates exact data matching and the usage of the proper representation to guarantee that the analysis is accurate. Having a model for a federated ontology may help manufacturers overcome various problems, as demonstrated in our use case. Optimized risk management utilizing a federated ontology model for detecting blindside hazards that might cause large disruptions in manufacturing processes can be used to practice more intelligent manufacturing.

54.2. Challenges:

There are a number of obstacles in our endeavor to promote Big Data integration, as we mentioned in our case study and in our assessment of previous studies. These issues, as we've seen in our sector, are present in a variety of Big Data contexts.

54.2.1. Scalability of Semantic Web Tools:

Most existing Semantic Web technologies that have been used in relational database applications struggle to accommodate Big Data (terabytes and beyond). They need to be better integrated with Hadoop's fundamental technologies.

54.2.2. Incomplete Data:

Existing data sources are usually limited, ambiguous, and incomplete, making logical conclusions difficult to reach.

54.2.3. New Applications:

There are now more application cases in the support of mobility and driver awareness. In terms of autonomous cars, driver behaviors, routing, scheduling, and urban planning, they exist in our domain. The integration process becomes much more complicated as a result of this.

54.2.4. Lack of Industrial Ontologies:

While some ontology is available, much more work is needed to support detailed semantic annotation of data sets.

54.2.5. Parallelization of Big Data tools:

Few software programs, while being promoted as "Big Data" tools, provide true support for parallel architectures, forcing developers to typically deliver analysis only at filtered or summarized data levels rather than fully leveraging the promise of Big Data.

54.2.6. Support for Real-Time Streaming:

As Big Data systems begin to support real-time processing, support for high-speed data streams must be considered.

54.2.7. Incompatible Data:

Vehicle data may be linked to specific vehicle programs and may differ according to various standards. Frequently, characteristics may not be shared across all vehicle kinds, resulting in data that is incompatible.

55. CONCLUSION

We investigated the quality of our data sources in the context of a Big Data environment in this paper. We discovered a data strategy and framework that enables the semi-automated mapping of various data sources using shared domain ontology. Several advantages of the methodology for adding additional data sources were detailed during this process. The utility of Supply Chain risk detection has been demonstrated through a test scenario and case study.

For this example, the ontology federation process was done manually, but our goal is to automate it. While it may not be possible to entirely automate the process, employing semantics and annotation to aid ontology federation can be beneficial. Geospatial data, such as latitude and longitude, for example, can be easily identified, but other types of data cannot. Because zip

codes are used in the United States but not in other countries, the system must be aware of this information. Ontologies will have good descriptions that can be read and understood in some cases, but information will have to be found in other ways in others. This is a crucial step in the ontology federation process, and using the federated ontologies will necessitate semantic knowledge.

In our application space, we've also identified a number of challenges. They must be addressed in order for Big Data applications to reach their full potential, as previously stated. There will be noticeable advances in application development for Big Data as a result of this, as well as a more developed Semantic Web technology stack.

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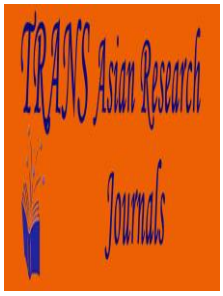

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PSYCHOLOGICAL ASPECTS DETERMINING THE PROFESSIONAL COMPETENCE OF FUTURE MILITARY PILOTS

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ABSTRACT

The article provides a more detailed analysis of the socio-psychological features of the formation of professional competence in future military pilots. The criterion of factor analysis was also used in the joint surveys. Also, socio-psychological features of the formation of professional competence in future military pilots were used in cluster analysis, along with the results of the research, as well as the ratios of officers to the questionnaires. In order to express the degree of closeness of the scales in the survey, the following indicators were used in the cluster analysis: aspiration and self-confidence for dominance in the first cluster, confidence-doubt and emotional stability in the second cluster, social type and entrepreneurial type in the third cluster, fourth factors such as responsibility and courage in the cluster, courage and high self-esteem in the fifth cluster, and striving for dominance and professional tolerance in the sixth cluster.

KEYWORDS: *Socio-Psychological Features, Military Pilots, Cluster Analysis, Questionnaires, Indicators, Professional Tolerance, Emotional Stability, Courage, Dominance.*

I. INTRODUCTION

The questionnaire "Study of the person by means of 16 factors" developed by R.B. Kettell, Holland's questionniare "Professional level", Chumakova's "Professional will" methods such as “Study of qualities” and “Study of professional institutions” developed by IM Kondakov were used in order to identifying professional competence and the cause of psychological features of future military pilots who study in military institution with the help of factor analysis. Factor analysis is considered such a statistical indicator that the methodologies or questionnaires used in the study are one of the criteria for determining whether the scales are important and attaining a high result in achieving the goal of the study. The following table shows the factor analysis of the results of surveys of fourth-year cadets of the Higher Military Aviation School of the

Republic of Uzbekistan on the study of personality using 16 factors and the study of professional qualities.

II. MAIN PART

TABLE 1KETTELL AND FACTOR ANALYSIS INDICATORS OF THE LEVEL OF PROFESSIONAL QUALIFICATIONS SURVEYS

Scales	Factors					
	1	2	3	4	5	6
propensity to communicate	-0,391	0,431	-0,127	0,603	-0,664	0,549
emotionally stable-unstable	0,439	-0,659	-0,555	0,166	-0,063	0,092
striving for dominance - dependence	-0,313	0,032	-0,072	0,676	-0,322	-0,039
social maturity-consciousness	-0,812	0,039	-0,184	0,082	0,581	-0,269
boldness - shyness	0,454	0,625	-0,508	-0,007	-0,039	-0,506
reliability-doubt	-0,552	0,542	0,192	0,557	0,134	0,261
self-confidence - disbelief	0,431	-0,023	-0,060	0,554	0,525	-0,307
independence-dependence	-0,307	0,505	-0,569	-0,212	0,032	0,524
self-control	0,477	0,495	0,533	-0,232	-0,550	-0,615
tension-relaxation	0,506	0,340	0,486	0,521	0,486	-0,300
responsibility	0,527	0,575	0,161	0,022	-0,267	0,042
courage	-0,443	-0,324	0,679	0,120	0,541	0,093
tenacity	0,260	0,178	0,117	-0,202	0,786	0,253
perseverance	0,713	0,553	0,254	0,582	0,001	0,472

The results of the study on the socio-psychological features of the formation of professional competence in future military pilots showed that the results of surveys of cadets of the Higher Military Aviation School of the Republic of Uzbekistan using 16 factors and professional qualities determine their socio-psychological characteristics in the process. The results of the cadets' results on factor analysis were combined into 6 factors. The psychological factors that make up the first scale are: emotionally stable-unstable 0.439, social maturity-consciousness 0.812, courage-shyness 0.454, confidence-doubt 0.552, self-confidence 0.431, tension-relaxation 0.506, responsibility 0.527, courage 0.443 and determination which mutually differentiated with them. Psychological factors that make up the second scale: propensity to communicate 0.431, emotionally stable-unstable 0.659, courage-shyness 0.625, confidence-doubt 0.542, independence-dependence 0.505, self-control 0.495, responsibility 0.575 and persistence 0.553 are characterized by results. The psychological factors that made up the third scale were emotionally stable-unstable at 0.555, courage at 0.508, independence at 0.569, self-control at 0.533, tension at 0.486, and courage at 0.679. The psychological units that made up the fourth scale were distinguished by psychological characteristics such as propensity to communicate 0.603, dominance aspiration-dependence 0.676, confidence-doubt 0.557, self-doubt 0.554, tension-relaxation 0.521 and persistence 0.582. The psychological units that made up the fifth

factor were differentiated by characteristics such as propensity to communicate 0.664, social maturity-consciousness 0.581, lack of self-confidence 0.525, self-control 0.550, tension-relaxation 0.486, courage 0.541 and resilience 0.786. the units that made up the final scale were: psychological characteristics such as propensity to communicate 0.549, courage-shyness 0.506, independence-dependence 0.524, self-control 0.615 and persistence 0.472. The cumulative values of the cadets are grouped into six factors, and these factors constitute the key features that determine the key values and significant differences in the survey. The following table shows the factors of factor analysis obtained by fifth-year cadets on surveys of occupational types and occupations.

TABLE 2 FACTOR ANALYSIS INDICATORS OF OCCUPATIONAL TYPES AND LEVEL OF INQUIRIES OF PROFESSIONAL INSTALLATIONS

Scales	Factors			
	1	2	3	4
Realistic type	-0,686	0,001	-0,310	0,535
Mental type	0,434	0,685	0,520	0,182
social type	0,656	0,553	0,108	0,585
conventional-conditional type	-0,732	0,491	0,464	0,222
entrepreneur type	0,450	0,642	-0,114	0,511
artistic type	0,535	-0,114	0,631	-0,049
irrational career choice	-0,060	-0,402	0,485	0,697
rational professional choice	0,452	0,190	-0,455	-0,445
professional activity	0,699	-0,310	-0,077	0,073
high self-esteem	-0,296	-0,482	0,632	-0,249
professional endurance	0,294	-0,585	-0,482	0,319

In order to clarify our research on the socio-psychological features of the formation of professional competence in future military pilots, we can see that the units that make up the factor analysis of surveys among cadets of the Higher Military Aviation School of the Republic of Uzbekistan to determine the degree of impact of military training on cadets. The results of the subjects showed that the indicators of factor analysis were combined into 4 factors. The psychological factors made up the first scale differed with results such as realistic type 0.686, mental type 0.434, social type 0.656, conventional-conditional type 0.732, entrepreneurial type 0.450, artistic type 0.535, rational professional choice 0.452 and professional activity 0.699. The psychological factors that make up the second scale are characterized by results such as mental type 0.685, social type 0.553, conventional-conditional type 0.491, entrepreneurial type 0.642, high self-esteem 0.482, and professional tolerance 0.585. The psychological factors that make up the third scale are: mental type 0.520, conventional-conditional type 0.464, artistic type 0.631, irrational career choice 0.485, rational career choice 0.455, high self-esteem 0.632 and professional endurance 0.482 degrees. It should be noted that the psychological units that make up the fourth scale are distinguished by psychological characteristics such as realistic type 0.535, social type 0.585, entrepreneurial type 0.511, irrational professional choice 0.697 and rational

professional choice 0.445. We can see that the results of the study of cadets of the Higher Military Aviation School of the Republic of Uzbekistan are combined into four factors, and these factors are the main indicators that determine the main results and indicators in the survey. The following table shows the indicators of factor analysis obtained by the cadets of the Higher Military Aviation School of the Republic of Uzbekistan on the study of 16 personality factors and surveys of professional qualities.

III. METHODS AND RESULTS

TABLE 3 KETTELL AND FACTOR ANALYSIS INDICATORS OF THE LEVEL OF PROFESSIONAL QUALIFICATIONS SURVEYS

Scales	Factors					
	1	2	3	4	5	6
propensity to communicate	-0,641	0,293	-0,272	0,036	0,546	-0,166
emotionally stable-unstable	-0,251	-0,537	0,517	0,465	-0,295	0,442
striving for dominance - dependence	0,683	0,543	0,487	0,295	0,110	-0,089
social maturity-consciousness	0,230	0,725	0,293	-0,559	-0,112	-0,098
boldness - shyness	0,826	0,285	0,045	0,089	0,118	-0,472
reliability-doubt	0,610	-0,095	-0,527	0,565	0,013	-0,127
self-confidence - disbelief	-0,660	-0,022	0,497	0,165	0,046	-0,235
independence-dependence	0,144	0,584	0,342	0,214	0,498	0,460
self-control	-0,518	0,089	-0,234	-0,089	0,758	0,073
tension-relaxation	-0,238	0,650	0,549	-0,310	-0,072	-0,048
responsibility	0,465	-0,527	0,068	-0,527	0,077	-0,077
courage	0,215	-0,462	0,651	-0,393	0,509	-0,143
tenacity	0,545	0,120	-0,200	-0,318	0,060	0,629
perseverance	0,031	-0,599	0,504	0,510	0,505	0,055

Socio-psychological features of the formation of professional competence show that the results of surveys of cadets of the Higher Military Aviation School of the Republic of Uzbekistan using 16 factors and the study of psychological factors such as professional qualities and the identification of important factors are key priorities. The results of the fifth stage cadets on factor analysis were 6 factors. The psychological factors that made up the first scale were different: 0.641 for communication, 0.683 for dominance, 0.826 for courage, 0.610 for confidence, 0.660 for lack of self-confidence, 0.518 for self-control, 0.465 for responsibility and 0.545 for perseverance. The psychological factors that make up the second scale are characterized by the desire for dominance - 0.543, emotionally stable - 0.537, social maturity - 0.725, independence - 0.584, tension - 0.650, responsibility - 0.527, courage - 0.462 and perseverance - 0.599. The psychological factors that made up the third scale were emotionally stable-unstable at 0.517, striving for dominance at 0.487, confidence at 0.527, self-doubt at 0.497, tension-relaxation at

0.549, tenacity at 0.504, and courage at 0.651. The psychological units that made up the fourth scale were distinguished by psychological characteristics such as emotionally stable-unstable 0.465, social maturity-consciousness 0.559, confidence-doubt 0.565, responsibility 0.527, and persistence 0.510. The psychological units that make up the fifth factor differed in characteristics such as: propensity to communicate 0.546, independence-dependence 0.498, self-control 0.758, courage 0.509, and perseverance 0.505. The units that made up the last scale were psychological characteristics such as emotionally stable-unstable 0.442, courage-shyness 0.472, independence-dependence 0.460 and resilience 0.629. The results of the survey of cadets of the Higher Military Aviation School of the Republic of Uzbekistan were divided into six factors, and these factors formed the main features that reflect the main features and specifics of the survey. The following table shows the indicators of factor analysis obtained on the survey of professional types and professional installations of cadets studying at the Higher Military Aviation School of the Republic of Uzbekistan.

TABLE 4 FACTOR ANALYSIS INDICATORS OF OCCUPATIONAL TYPES AND LEVEL OF INQUIRIES OF PROFESSIONAL INSTALLATIONS

Scales	Factors			
	1	2	3	4
Realistic type	0,801	0,110	0,577	-0,553
Mental type	0,525	0,515	0,678	-0,104
social type	-0,459	0,512	-0,531	0,499
conventional-conditional type	0,603	0,478	0,127	0,234
entrepreneur type	-0,480	0,113	0,420	-0,187
artistic type	0,024	-0,744	0,303	-0,275
irrational career choice	0,737	-0,365	-0,280	0,595
rational professional choice	0,195	0,581	-0,459	-0,475
professional activity	0,276	0,498	0,515	0,392
high self-esteem	-0,633	0,005	0,486	0,450
professional endurance	0,490	-0,441	-0,117	0,623

The results of the study on the methods of studying the socio-psychological features of the formation of professional competence in future military pilots distinguishing factors cover key priorities. The results of the test results on the factor analysis were 4 factors. The psychological factors that made up the first scale differed with results such as realistic type 0.801, mental type 0.525, social type 0.459, conventional-conditional type 0.603, entrepreneurial type 0.480, high self-esteem 0.633, irrational career choice 0.737 and professional tolerance 0.490. The psychological factors that make up the second scale are characterized by results such as mental type 0.515, social type 0.512, conventional-conditional type 0.478, artistic type 0.744, rational professional choice 0.581, professional activity 0.498, and professional tolerance 0.441. The psychological factors that make up the third scale are: realistic type 0.577, mental type 0.678, social type 0.531, rational professional choice 0.459, high self-esteem 0.486, and professional activity 0.515 degrees. It should be noted that the psychological units that make up the fourth scale are characterized by psychological characteristics such as realistic type 0.553, social type 0.499, irrational career choice 0.595, high self-esteem 0.450, professional tolerance 0.623 and

rational career choice 0.475. The results of the survey of cadets of the Higher Military Aviation School of the Republic of Uzbekistan were divided into four factors, and these factors formed the main features that reflect the main features and specifics of the survey. The following table presents the factors of factor analysis obtained from the study of personality using 16 factors and professional qualification surveys of pilot officers engaged in professional activities during military service.

TABLE 5 KETTELL AND FACTOR ANALYSIS INDICATORS OF THE LEVEL OF PROFESSIONAL QUALIFICATIONS SURVEYS

Scales	Factors					
	1	2	3	4	5	6
propensity to communicate	-0,102	-0,644	-0,236	0,464	0,199	0,058
emotionally stable-unstable	-0,643	0,040	0,481	0,036	-0,086	0,504
striving for dominance - dependence	0,550	-0,507	-0,230	-0,221	-0,121	-0,057
social maturity-consciousness	0,220	-0,434	0,707	-0,011	-0,084	-0,223
boldness - shyness	0,684	0,161	0,431	-0,331	0,482	0,003
reliability-doubt	0,615	-0,418	-0,152	-0,163	0,402	0,120
self-confidence - disbelief	0,086	-0,011	-0,023	0,498	0,232	0,712
independence-dependence	-0,515	0,526	-0,032	-0,553	0,547	0,518
self-control	0,518	0,550	-0,535	0,174	-0,188	0,129
tension-relaxation	0,172	-0,121	0,291	0,684	0,528	-0,237
responsibility	0,196	0,539	0,483	-0,559	0,364	0,302
courage	0,120	0,548	-0,141	0,485	0,341	-0,543
tenacity	0,533	0,247	0,459	0,287	-0,506	-0,523
perseverance	-0,758	-0,005	-0,012	0,020	0,232	-0,198

The results of the study show that we will clarify our research on the socio-psychological features of the formation of professional competence. The results of surveys of psychological characteristics of officers serving in the military using 16 factors and the study of psychological characteristics, such as professional qualities, and how to distinguish between them psychological characteristics and the factors that are important to them, cover key priorities. The performance of the officers on the factor analysis was 6 factors. The psychological factors that made up the first scale were different: 0.643 for emotional stability, 0.550 for dominance, 0.684 for courage, 0.615 for confidence, 0.515 for independence, 0.518 for self-control, 0.758 for perseverance, and 0.533 for resilience. The psychological factors that make up the second scale are characterized by a tendency to communicate: 0.644, the desire for dominance - 0.507, social maturity - 0.434, independence - 0.526, self-control - 0.550, responsibility - 0.539 and courage - 0.548. Psychological factors that formed the third scale were recorded as 0.481 for emotional stability, 0.707 for social maturity, 0.431 for courage, 0.535 for self-control, 0.483 for responsibility, and 0.459 for resilience. The psychological units that made up the fourth scale were characterized by psychological characteristics such as propensity to communicate 0.464,

lack of self-confidence 0.498, independence-dependence 0.553, tension-relaxation 0.684, responsibility 0.559, and courage 0.485. The psychological units that make up the fifth factor are distinguished by features such as courage-shyness 0.482, independence-dependence 0.547, tension-relaxation 0.528 and resilience 0.506. The units that formed the final scale were emotionally stable-unstable 0.504, self-doubt 0.712, independence-dependence 0.518, courage 0.543, and resilience 0.523. The results of the study obtained from cadets serving in the military are divided into six factors, and these factors are the psychological features that constitute the main psychological characteristics. The table below presents the interrelationships of surveys between officers 'occupational types and occupations.

TABLE 6FACTOR ANALYSIS INDICATORS OF OCCUPATIONAL TYPES AND LEVEL OF INQUIRIES OF PROFESSIONAL INSTALLATIONS

Scales	Factors			
	1	2	3	4
Realistic type	0,547	-0,128	0,634	0,534
Mental type	-0,559	-0,531	-0,471	0,035
social type	0,676	0,508	-0,567	0,040
conventional-conditional type	0,707	-0,053	-0,173	-0,129
entrepreneur type	-0,074	0,525	0,310	0,546
artistic type	-0,445	0,601	0,474	-0,532
irrational career choice	-0,717	0,018	0,151	0,512
rational professional choice	-0,558	-0,473	0,505	-0,231
professional activity	0,312	0,673	0,270	-0,302
high self-esteem	0,307	-0,531	0,505	0,272
professional endurance	-0,490	0,439	-0,244	0,517

The results of a study on the socio-psychological features of the formation of professional competence in pilots serving in the Defense System of the Republic of Uzbekistan show that factor analysis is characterized by the separation of psychological characteristics into significant and insignificant factors. The psychological factors that made up the first scale differed with results such as realistic type 0.547, mental type 0.559, social type 0.676, conventional-conditional type 0.707, artistic type 0.445, irrational career choice 0.717, rational career choice 0.558 and professional tolerance 0.490. The psychological factors that make up the second scale are characterized by results such as mental type 0.531, social type 0.508, entrepreneurial type 0.525, artistic type 0.601, rational professional choice 0.473, professional activity 0.673, high self-esteem 0.531 and professional tolerance 0.439. The psychological factors that make up the third scale are characterized by: realistic type 0.634, mental type 0.471, social type 0.567, artistic type 0.474, rational professional choice 0.505 and high self-esteem 0.505 degrees. It should be noted that the psychological units that make up the fourth scale are distinguished by psychological characteristics such as realistic type 0.534, entrepreneurial type 0.546, artistic type 0.532, irrational professional choice 0.512 and professional tolerance 0.517. The results of the study, obtained from officers serving in the military, were divided into four factors, and these factors formed the main features that reflected the key features and individual aspects of the survey. The following table shows the total cluster analysis indicators obtained from the surveys of cadets and officers.

Figure 1. Dendogram indicators of professional competency surveys

IV. CONCLUSION

The results of the above research show that the feedback of cadets and officers on the questionnaires provided is a significant reflection of the scales on the criteria of factor analysis, which is important in their professional activities.

To ensure that pilots possess the necessary skills for effective teamwork during line operation, airlines have introduced various diagnostic methods into their selection procedures that are designed to assess the social competence of pilot applicants prior to employment. Results show moderate to high correlations between 2 social competence questionnaires and certain personality dimensions, although only 1 social competence questionnaire (the Social Skills Inventory [SSI]) confirms systematic common variance with the behavior-oriented assessments of related concepts in the AC. In addition to traditional selection procedures, the SSI could neither improve the prediction of applicants' overall performance in pilot selection nor did it show substantial intercorrelations with an external criterion in the pilot training. Therefore, social competence and personality questionnaires could serve as an additional component in the preselection, but might not replace the AC, which provides information about the behavioral component of social competence in real social interactions.

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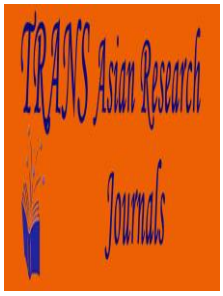

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YOUTH VOCABULARY IN GERMAN AND ITS HISTORICAL DEVELOPMENT

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ABSTRACT

„Ich hör` es gerne, when the Jugend plappert:
Das Neue klingt. Das Alte klappert “
(W. J. Geothe)

The study of the vocabulary of German-speaking youth is one of the new and little-studied topics in linguistics. In particular, its semantic and morphological-syntactic analysis is found only in the works of a small number of scholars, and it is not uncommon to compare and analyze it with other languages, especially with unrelated languages. That is why the semantic and syntactic analysis of the lexicon of young people in German, its comparative study with a non-related language - Uzbek, and its consideration in the Uzbek language determine the main content of this article.

KEYWORDS: *Consideration, Vocabulary, Semantic, Morphological, Lexicon.*

INTRODUCTION

The main purpose is to analyze words related to youth lexicon in German on the basis of the dictionary "Wörterbuch der 2012 Jugendsprache" published by PONS, to determine the morphological and semantic features of these words and to draw the necessary conclusions.

As noted above, the scientific study of youth vocabulary in linguistics is a little-studied field. The scientific novelty of this article is determined by the fact that the semantic features of the lexicon of young people in German, especially its syntactic features, are rarely studied not only in our country but also in German-speaking countries.

Although the analysis of the concept of youth lexicon in German is a relatively new direction in linguistics, a number of scholars in these studies have come to the attention of the general scientific community. Among the scholars who have made significant contributions to the study

of youth lexicon in the German language are J.K. The case of Cailleux is an example. But of the scholars named above, only J.K. Androutsopulus is a scholar who has syntactically studied the lexicon of youth. H. Henne, E. Neuland, P. Shlobinski, and H. Ehman, on the other hand, were more concerned with the general analysis of youth vocabulary, and with the scientific question of whether there is a special vocabulary in linguistics called "youth vocabulary."

The article is based on the Wörterbuch der 2012 Jugendsprache published in 2012 by PONS and the Wörterbuch der Jugendsprache 2014 published in 2013.

It should be noted that in the study of modern German it is not difficult to understand the diversity of lexical vocabulary. The lexical analysis of the language shows that this diversity is the product of a long process of development of the German vocabulary. Recent lexical scientific analysis of the German language has made it possible to differentiate and group words according to their origin, structure, usage, and semantics. Word stratification is the differentiation of layers according to the layers that develop the language and are considered to be the multifaceted communication of a language society. Every language is diverse not only territorially but also socially and functionally. Here we can see different versions of the language. According to linguist A. Meillet, a language has its own vocabulary, which is used by autonomous social groups within the society that uses that language.

A similar situation can be found in modern German. Some words in German sound different in one area depending on personal or everyday relationships, professional relationships, and in another. Such words appear when the different conditions and requirements of social communication are matched by an instrument of understanding.

The heterogeneity of natural language (diversity within a natural language) is an important area of sociolinguistic research. At the heart of sociolinguistics is the description and explanation of language variants, their dynamic as well as interchangeable relationships. The basis of the lexical layers of the German language lies primarily in the territorial, social and functional boundaries and differences in language variants. The division of the German language into groups according to these differences was first developed by R. Gross. Although its stratification is not fully consistent today, some groups do agree with the currently recognized stratification.

The national language (die Nationalsprache), which serves as a communication for the whole nation, is a form of reflection of national culture. The term also includes literary language (die Schriftsprache) and regional dialects (territorialeDialekte).

In Germanism, the most appropriate form of language is ad called abiy language. The emergence of this term is associated with a long historical process. Before the norms of oral speech were strengthened, the norms of written speech, which included the norms of writing and traditions, emerged. In the early 1960s, Schriftsprache and Literatursprache were described by researchers as different concepts. Today, however, the two terms are used interchangeably to describe literary language. Literary language is the normative form of oral and written speech in the German national language accepted throughout Germany.

The second most important form of language that is part of a common language form with its clear boundaries and characteristics is the spoken language (Umgangsprache). Spoken language transcends local boundaries. Spoken language is a language between literary language and dialects. Functionally, it is a means of communication in oral language. Spoken language is often

used in private conversations, in informal situations. According to their closeness to literary language, colloquial language is divided into 3 main groups:

1. Conversational language close to literary language

2. A colloquial language that covers a large area

3. Spoken language spoken in a small area

It should be noted that these groups are divided according to the degree of accumulation of literary language features. A colloquial language that covers a small area contains a large number of dialects, and this group is a colloquial language that is close to the dialect (Halbmundart).

According to the sociolinguistic classification of language forms, words in German differ as follows:

• Words and phrases that are understandable to everyone in the language community and are used in general language communication

• Words and phrases used in a particular field or social group

• Territorially limited words and phrases

The characteristics and alternating relationships of these groups serve as the object of sociolinguistic research.

Many terms are used in Germanistics to analyze the vocabulary of the German language from a socio-professional point of view. For example: Sondersprachen, Sonderwortschatz, Sonderlexik and others. Vocabulary develops on the basis of common professions, common interests, common lifestyles, conditions in different groups of language society. Sondersprache are words and phrases that go beyond the literary language of social groups in a language society, but are understandable to members of that group. This language is limited by different characteristics of different professions and group members. When talking about the vocabulary of a particular language, it is not the individual violation of the norms of literary language that is taken into account, but the linguistic characteristics of the whole group of speakers. These distinctive features form the basis of sociolinguistic research. The aspect of the specificity of language features in relation to socio-political groups and strata is called sociolect.

In German studies, special languages are traditionally divided into 3 groups:

• Standessprache (Jargonlar)

• Berufssprachen (Kasb-korga oid til)

• Fachsprachen (Terms)

It should be noted that there are a number of theoretical differences in the division of a particular language into groups. According to the theory of the German linguist F. Kluge, special languages are divided into 2 major groups:

• According to the distribution of the language in different places - Standessprachen

• Used by different professions - Berufssprachen (This language includes the language of traders, the language of farmers, the language of the military, the language of hunters, etc.)

According to Kluge, even the language of poets, men and women differs in the structure of this language. According to him, the word "language" (Sprache) used in the term "special language"

is also not used in the full sense. Because this language is not a language with a grammatical, phonetic, lexical system, but only based on the vocabulary of special layers. Thus, according to linguist F. Klugen, social lexicon is unique to oral speech. In written speech, these words are used in a stylistic way.

There is no single correct answer to this question in Russian linguistics. Russian linguist EM Galkina-Fedoruk distinguishes between groups of aristocrats, merchants and citizens in this language. A. Efimov divides them into groups of aristocrats, believers, merchants and bureaucrats. There are many such classifications. This topic is always full of controversy.

Well-known linguists L.R. Sinder and T.V. Stroyeva divide special language into 2 major groups: Occupational language (Berufslexik) and jargons. According to them, the language of the profession is called professionalism. Professionalisms are words and phrases that occur in the process of the general influence of people in different spheres of society and often express scientific terms. In this case, the scientific and technical term It is a bit difficult to tell the difference between ingenuity and professionalism. It should be noted that the terms differ from professionalism in their neutral stylistic coloring. The descriptiveness of professionalism in professional lexicon is higher than in terms. The terms are mostly international in nature. M .: Voltmeter, operation, mathematics, philology. At the heart of most of the terms are Latin and Greek. The difference between professionalism and terminology is that professionalism, like terms, is not defined by a clear rule. Professionalism is a word that is not clearly defined, but belongs to science. Jargon, on the other hand, is a language between people belonging to a certain group, consisting of words and phrases that represent different concepts of the profession of the group of people they serve, so such words and phrases can be understood only by this group of people. Will be.

From the above data, it is clear that the socio-professional classification of language is one of the unresolved problems in linguistics. However, in our view, the views of Russian linguists MD Stepanova and II Chernyasheva on the classification of special languages (Sonderlexik) are much more accurate. They divided the special language into 2 groups:

• Scientific language (Fachsprachen- Fachwortschätze)

• Language specific to certain groups (gruppenspezifischeWortschätze)

According to them, scientific language includes terms, professional words and jargons, as well as professionalism. A language that specializes in groups is a special vocabulary that belongs to different social groups in a particular language community. The linguistic features of social groups are manifested primarily in words that specialize in that group.

The concept of youth lexicon (Jugendsprache) began to be used in German linguistics in the 1930s. Youth vocabulary is an important and integral part of group vocabulary. Language is constantly evolving and constantly under new influences. Sometimes under such influences new words are accepted, in some words the meaning changes. This happens especially quickly in the vocabulary of young people. The topic of youth language (Jugendsprache) has always been one of the most interesting and controversial topics.

Youth vocabulary consists of words or phrases that have been used or are being used at different times by different groups of young people of a certain age. It should be noted that such a lexicon can be observed all over the world. This vocabulary is usually used among peers, and new words spread faster than usual.

In sociolinguistic research, the vocabulary of young people is studied in several directions, in each aspect. Nowadays, youth lexicon is considered as a new phenomenon of modern language. However, it is not well known that in ancient times, young people had their own language styles and that there were significant differences between the language used by adults and young people living in those times. In the historical study of youth vocabulary, we come across ancient dictionaries and documents on the language of historical students, known as the first forms of modern youth language in Germany. These documents, dictionaries, and correspondence reflect the language style, lifestyle, level of education, and social status and dignity of the youth of that time. By the XVI-XVII centuries, the socio-political status of young people, especially students, increased significantly. During the Reformation, students gained much freedom. This has led to the development of youth vocabulary. Student lexicon (Burschensprache), which appeared in the XVIII-XIX centuries, is important in the study of youth vocabulary. Since the middle of the 19th century, special dictionaries have been created for this language. Early literary sources on the language include Zacharies'sRennomist (1744), Kortum'sJobsiade (1784), Lauhard's Correspondence (1792), Wedekind's Diaries (1824), and Goethe's Dichtung und Wahrheit (1811). we can quote. The most famous example of medieval student writing today belongs to Robert Salmasius:

„O Zeiten! O Sitten!

How many people in the Feldgeschrei district of Purschen go to Gasse and aus den Fenster? ... ”(Salmasius, 1974, p. 67)

In a call that begins with these words, Salmasius called on students to be free and free. The words are the preface to Salmasius's Handlexikon der unter den Herren Purschen auf Universitäten gebräuchlichsten Kunstwörter. The dictionary was compiled in 1749 and has since been used by historical German students iStudentenlexikon (1781), Augustin's Idiotikon der Burschensprache (1795) and Academicajuventus. Die deutschenStudentennachSprache und Sitte ”(1781). A serious study of student vocabulary began in the late 19th century with Myers's HallischerStudentensprache (1894) and Klugen'sDeutscherStudentensprache (1895). When studying the language of historical German students, it becomes clear that the vocabulary of young people cannot develop autonomously from a single social vacuum. The vocabulary of young people is simultaneously reflected in the linguistic heterogeneity of socio-cultural life, as well as in the influence of cultural and historical events.

It should be noted that the lexicon of historical students, as well as the lexicon of modern youth, was greatly influenced by different words. In the lexicon of historical German students, there are a large number of words, primarily from Greek and Latin. It should be noted that in this case, we can encounter not only the words alone, but also in some cases, mixed with the German language. The combination of German and Latin in the lexicon of historical students is called "makkoronischLatein". Examples of such words are "gassatumgehen", "Konkneipant", "Lappalien", "Sammelsurium", "verlustieren" used at that time. There was also a mixture of German and Greek at that time. Examples of such phenomena are "burschikos", "studikos", "Illiade", "luftikus", "Musen", "schwulibus". Such confusing words often served as irony or word play, and in some cases as a style of language adapted to a new group. Another aspect of the language of Old German students is that this lexicon in some places also served as the criminal language of the time (das Rotwelsch). Some of these words are still used today. For example: blechen, pumpen, foppen, schofel, mogeln, stibitzen and others.

By the seventeenth and eighteenth centuries, as in many European countries, the influence of the French language could be traced back to the lexicon of German youth. This period is called the "a-la-mode Zeit" and, along with all other spheres, the influence of the French language on the German lexicon is observed. During this period, under the influence of the French language, special lexicons and styles specific to specific groups of students called the petits maîtres and the Rennomiste also emerged. It is noteworthy that at this time there were significant differences in the vocabulary of students at the universities of Göttingen, Leipzig and Jena. More detailed information about such differences can be found in Friedrich Laukhard Christian's memoirs on regional differences in his 1792 student lexicon.

By the beginning of the twentieth century, there was an interest in the vocabulary of schoolchildren. The first serious research on student vocabulary (Schüler-oderPennalersprache) was conducted by linguists Rudolf Eilenberg (1910) and Friso Melzer (1928). Melzer identifies three major topics in student language:

- School (for example, Streberleiche, Klatschmemme)

- Sports and games (egKullewatzen, Halla)

- People in the community, words related to others (for example, Na, du altesReff! Jux, Fez machen, doppelknorke)

The study of student vocabulary lasted until the 60s and 70s of the last century. The contributions of Heinz and Marianna Küpper, in particular, are significant in this study. They included words and phrases related to youth vocabulary (Jugenddeutsch 1970) in one section of their German dictionary. According to them, students' vocabulary covers the following areas:

• Education and school: Arschpauker, Poofstunden

• Education: pauken, fuschen, spicken, ponzen

• Authority: (a topic widely discussed in the 70s) Autoritetsbonze, Mecker-Monster.

• Holidays and leisure: Party, Heulbojen

• Words related to groups that are socially and stratified categories of youth: dufterKumpel, Strebelleiche

• Words under the influence of English: stress, homework, actionmäßig

It should be noted that the term student vocabulary is not used today. Only this sweat minni can be found only in some classifications of youth lexicon.

In short, the concept of youth lexicon is not only relevant to modern life today, but also a historical process. There is no clear definition of the concept of youth lexicon, and there is a lot of controversy about it.

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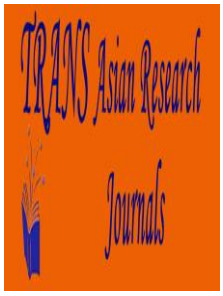

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THE PHENOMENON OF PHRASEOLOGICAL SYNONYMIS IN GERMAN

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ABSTRACT

Phraseological synonyms may be partially consistent with each other in terms of lexical content. An important role in the formation of phraseological synonyms is played by the formation of an analogy based on lexical-phraseological attraction, that is, the semantic conflict of language units based on any common features, during which their mutual semantic effect occurs.By studying the semantic features of phraseological units, it was found that they have the phenomena of phraseological polysemy, phraseological synonymy, phraseological antonymy, phraseological homonymy and paronymy. Phraseological synonyms are phraseologies that are semantically identical or very similar. They may differ from each other in terms of secondary semantic features, methodological features, syntactic structure (valence, etc.).

KEYWORDS: *Linguistics (German), Phraseological Synonymy, Semantic Microsystems, Phraseological Units.*

INTRODUCTION

Phraseological synonymy - Synonymy is one of the semantic microsystems between language units and is also quite common among phraseological units. To call two phraseological units synonymous, they must have the same meaning. We can't talk about synonymy without it. The same meaning cannot be understood as equal meaning. Each synonym has its own semantic edge, in addition to the general meaning core for that synonym slot. Synonyms usually differ in

one or more respects, one of which may be a difference in meaning. For example, to be destroyed by the earth - to be destroyed by the earth, to be thrown into the sky - the ashes were blown into the sky. These synonyms differ in the edge of meaning, regardless of other character traits: in the latter the meaning is somewhat stronger.

In defining phraseological synonyms, the underlying other image is also taken into account. For example, a mouth, a snout, a pinch are synonymous phraseological units, based on various images: the body of speech, a part of a head of grapes, the amount to be pinched.

Synonymy is a phenomenon defined by meaning. The same meaning is defined between phrase and phrase in monosemantic phraseological units. If a polysemantic phraseological unit is involved in a synonymous relationship, it must be derived from a specific phraseological meaning, not from a phraseological unit. Because each phraseological meaning may or may not have its own synonym.

Synonyms are language units that have a common meaning (denotative meaning is the same) and additional (connotative) meaning (features that express expressive, methodological and other relations). The phenomenon of linguistic units having the same meaning is called synonymy. This phenomenon is divided into lexical (lexical) synonymy, phraseological synonymy, syntactic synonymy, etc., depending on what language units are specific. A group of words that are mutually synonymous is called a series of synonyms. A series of synonyms consists of two or more words. For example, a series of synonyms for a spring consists of two words, and a series of synonyms for a face consists of many words. Polysemous words can be one or more synonyms with a specific meaning or meanings. For example, the word finish is one of the words to finish, to finish, to finish ... in one sense, and to do, to lose, to destroy in another sense.

K.Proost argues that phraseological synonyms are more common than lexical synonyms. In particular, he points out that various “figurative” expressions cannot be considered synonymous, at least not completely synonymous. In our view, the idea that there are no absolute synonyms in phraseological expressions is closer to the truth. In general, language never recognizes uniformity.

Indeed, "the number of phraseologically synonymous synonyms is very small." For example, - writes U. Tursunov and other linguists, - although the general content for the phrases "raised nose" and "swollen mouth" is "arrogance", the embodiment of this common meaning is different. However, the meaning of the phrase "swollen nose" is stronger than the phrase "the nose is raised."

Synonymous phrases should be distinguished from variants of a phrase by paying attention to the word components of the phrases. There is no doubt that phrases that do not contain a single word in the lexical structure are synonymous. For example, "to be angry" means: jm kocht das Blut in den Adern - to boil blood from anger, sich grün und blau ärgern - to blush with anger, jm platzt der Kragen - magic wütend sein, da geht jm der Hut hoch - top hair , die Galle läuft jm über - magic wütend sein, eine Wut im Bauch haben, (die) Geduld verlieren - keine Geduld mehr haben, einen Bauch voll Zorn (oder Wut) haben - magic wütend sein, auf der Palme sein - jemanden it Wut bring, versetzen, in Harnisch geraten- zornig werden, aus der Haut fahren– ausrasten, die Beherrschung verlieren, in die Luft gehen - exp there is no doubt that expressions with different lexical content, such as lodieren, are synonymous. But it should be borne in mind that a component in the lexical structure of synonymous expressions may be represented by the same word. However, the components of a phrase must not be synonymous. Otherwise it is equal

to the variants of a phrase. For example::jmdm. eins / etwasaufsDachgeben, jmdm. eins / etwas auf den Deckelgeben, jmdm. eins / etwas auf den Hut geben, jmdm. eins / etwas auf die Nasegeben or to meet suddenly, the following combinations of meanings can also be a clear example of this: jm in die Armelaufen –zufälligtreffen, jmüber den Weglaufen - to get out of someone's way, jmvor die Füßelaufen - to get out of someone's way, jemandemvor die Füßelaufen - to get out of someone's foot. Although the word "laufen" in this synonymous series is repeated, they are not variants, because the words "Arme, Weg, Füße" in the phrases are not synonymous with each other.

There are the following types of phraseological synonyms:

1. Ideographic synonyms. Ideographic synonyms are distinguished by semantic coloring. According to the compatibility of archetypes, that is, common semantics, they differ from different semantics, either individually or in several metaphors. For example: einen Affen [sitzen] haben; betrunken sein - einen kleinen Aal haben –leicht betrunken sein. Ideographic synonyms are semantic synonyms in which the lexical meaning of the words they contain differs from each other in terms of the volume of expression. It is necessary to pay attention to the synonym of love and affection, which is assimilated from Arabic into Uzbek. These words are synonymous in the lexical sense of “passion given to a person from the heart”. But the lexical meanings of these two words differ according to the size of the expression. The experience in the lexical sense of the word love is only for yor and Allah, and the experience in the lexical sense of the word love is also for yor, Allah, parents, children and relatives. This shows that the words love and affection are ideographic synonyms.

2. Methodological synonyms. Methodological synonyms represent the same concept, but differ in methodological connection. Understanding the methodological connection of this or that phraseology helps the system of phraseological signs. Phraseological units can be biblical (literary), neutral (general literary), verbal (informal), rude (vulgar). Sometimes a single phraseological unit is the source of synonymy, if a single word belonging to another style is replaced by a synonym, then two phraseological units that are considered stylistic synonyms are formed. For example: die Augen schließen, ins Graß beißen (salopp), derb –sterben.

3. Methodological and ideographic synonyms. Both pure semantic and stylistic differences are observed in these types of synonyms. Phraseological synonyms are coherent phraseologies belonging to the same grammatical class, with lexically partially compatible or completely incompatible, having common and differential semantic components, stylistically different or mutually compatible relationships. Methodological synonyms have a certain lexical meaning that is exactly the same in terms of core semantics, and the words that occur with it differ from each other according to their belonging to a particular social stratum.

4. The fact that semantic synonyms are composed of two or more, or even about ten synonymous words, creates synonymous series. There are also semantic lines in language richness. From these semantic rows, synonymous rows differ in the mutual semantic relationship of the words. This view of semantic synonyms is called speech synonyms in some literatures due to the fact that they have a mutual semantic difference with which speech is specific. In the same literature, a series of beautiful, beautiful, heartwarming synonyms are given and analyzed. The first is shown to belong to general lexicon, the second to poetic speech, and the third to colloquial speech. The semantic difference of the words in this synonymous series is also appropriate for the criterion given to methodological synonyms. Organically stressed synonyms have a certain

lexical meaning that is exactly the same in terms of core semantics, and is specific to which of these core semantics is emphasized. More precisely, the lexical meaning of words in a synonymous series is characterized by the fact that the core semaphore is the same, but the emphasis on the semaphores in this core semaphore is different.

For example, the lexical meaning of the words in the synonymous series to look, to look, to see, that is, the semantics consists of the semantics of "looking at an object", "lowering", "perceiving". The lexical meanings of words also convey connotative meanings in communication. But this core semantics of the lexeme semema will consist of these semantics. The verb to look has a 1-sema in the lexical sense, the 2-sema in the verb to look, the 3-sema in the verb to see, the word is brought to the center of attention in the core semantics of the lexical meaning. In other words, in the verb to look, the focus is on the object;

Is significant. The verb to look differs from the others in the inactivity of the language, the verb to see is permeable. Nevertheless, from a semantic point of view, the above difference determines their appearance. Because synonymy is determined by the lexical meaning of the words.

Based on the above classification, V.A. Of the 1,140 phraseological expressions cited in Caslandz's Handbook of Phraseological Synonymy in German, 336 are grouped into synonymous groups and are of particular importance for linguistic analysis with 76 practical directions. It provides a brief overview of the general content of the synonymous group, as well as the definition of semantic relationships, characteristics, and the scope of application of each member of the synonymous group.

Ideographic synonyms

• „Will you like Abteil lying next to him or her?

- Das ist mir Jacke wie Hose “.

Es ist jedem Jacke wie Hose (anyway, it doesn't matter)

• „Ob er sich ärgert oder nicht, das ist mir ganz schnuppe“

Es ist jedem alles schnuppe (no one cares)

Methodological synonyms

• „Frag doch meinen Bruder. Er kennt sich in Finanzdingen hervorragend aus. Er ist mit allen Wassern gewaschen “

Mit allen Wassern gewaschen sein (pixini quilt, pixi twisted)

• „Die Burschen sind mit allen Salben geschmiert. Man bekommt sie schwer zu fassen “

Mit allen Salben geschmiert sein (licking the snake's fat)

Methodological and ideographic synonyms

• „Er hat ja manchmal ganz gute Ideen, wenn er nur sich nicht so aufblasen wollte wie ein Frosch“.

Sich aufblasen wie ein Frosch (eingebildet, hochmütig sein)

• „Seit Fritz seine Leutnantsuniform bekommen hat, kennt man ihn überhaupt nicht wieder. Er stolziert einher wie Hahn auf dem Mist. “

Einherstolzieren wie der Hahn auf dem Mist (eingebildet, stolz sein).

• Einer der berühmtesten Schlager aller Zeiten ist der von Marlene Dietrich: „Ich bin von Kopf bis Fuß auf Liebe eingestellt“

Von Kopf bis Fuß (from head to toe)

• “Er ist Gentleman vom Scheitel bis zur Sohle” Vom Scheitel bis zur Sohle (from head to toe).

The considered examples of phraseological synonyms reveal how rich and colorful the German language is, the peculiarity of German culture. the phenomenon of synonymy in phraseology contributes to the diversity of stable compounds, while the application of any phraseology helps to describe the situation differently, to find the best linguistic solution in the processes of comprehension and translation. In addition, some phraseological synonyms also differ from each other in ideographic terms, i.e. with their specific nuances. For example, compare the following units that mean "drunk":

EinenAffen (sitzen) haben (can't stand)

Einen (kleinen) Aal haben (a little shirakayf).

Phraseological synonyms also differ according to their use in certain territories. "Arm sein wieeineKirchenmaus", which means "very poor" in all parts of Germany, is replaced by the phrase "poor as a church mouse" in the Swabian dialect "Dear haut nix as Laus, und dio send crank (diesind crank) phraseology is used. The Berlin dialect uses the phrase "Das istmirJackewie Hose" meaning "I don't care", while the Viennese dialect uses the synonyms "Das istmirWurst" and "Das istmir Pomade".

The same is true of Uzbek dialects. The authors of the textbook "Modern Uzbek literary language" write: In the dialects of Tashkent region, phraseological synonyms are used, such as to play the mountain - to announce something to everyone, to close the oven in the heat - to press the iron in the heat.

Group phraseologies with different structures are synonymous due to similarity of meaning. For example, there are various phraseologies in German to express the meaning of "out of place": Einen Vogel haben - nichtganzbeiVerstand sein; There are no Tassen in Schrankhaben - no ganzbeiVerstand sein.

Consider the synonymous line used to express the meaning of ‘doing useless work’: HolznachdemWaldetragen - carrying firewood into the woods; Wasser imSiebetragen - to carry water in a sieve; Wasser miteinemSiebeschöpfen - sichumsonstanstrengen. In addition, a number of phraseological synonyms may also be historically distinguished by the fact that they are assimilated from other languages, but such phenomena are not uncommon.

Most linguists work on the basis of AV Kunin's definition of phraseology: Phraseological units are important for general stability, in addition, word components are legally related to each other, which is characterized by a structural semantic model.

Phraseological synonyms also play an important role in the field of phraseology. Phraseologisms with the help of phraseological synonyms it is possible to apply them in different contexts according to different stylistic styles, while it is possible to express any idea using. The components in the structure of phraseologies are often figurative. At the heart of phraseology, which consists of word components with a figurative meaning, its original meaning is hidden.

There are also synonyms that can have the same meaning in different languages and become equivalent to each other. "The exact equivalent is a phraseology that has the same meaning in different languages," said Borisova in her scientific views. Such phraseologies may exist in different languages. However, the translation of their synonyms is not always consistent.

For example: von Kopf bis Fuss, von Scheitel bis zur Sohle, von Wirbel bis zur Zehe. Among these phraseological synonyms, only von Kopf bis Fuss has the same meaning when translated into Uzbek as in German, because in Uzbek there is a phrase "from head to toe" and can be equivalent to this phrase. It is possible to translate other phraseologies from German into our native language as "detailed, complete, complete" without the exact equivalents that can be translated into Uzbek. Also, if we want to translate them as expressions, such expressions as from head to toe, from thread to needle, from hair to tail are synonymous phraseological units that are equally suitable for translating these phraseologies.

Meaningful phraseological combinations in German, such as Grosse Augenmachen, den Mundaufsperren, are also synonyms that are completely consistent in context and differ from most other phraseologies in that they have their own equivalent in Uzbek. The equivalent of these phrases in our native language is the phraseology "open your eyes wide", "open your mouth".

For example, the palm of the soul (i) and the palm of the heart (i) are synonymous phrases: one lexical component is represented by the same word, and the other lexical component is represented by another word, and they are not mutually synonymous. Clicking on the kungl (i) and clicking on the heart (i) are equivalent to variants of a reciprocal expression. Because a lexicon | the component is the same word itself, and the second lexical component is mutually synonymous; (These options are based on the replacement of synonymous word-components).

Synonymy is an event defined by meaning. The same meaning is defined between a phrase and a phrase in monosemantic phraseological units. Because each phraseological meaning may or may not have a synonym in its own right. For example, the phrase monosemantic confession is synonymous in the first sense with the phrase polysemantic (triple) neck (i). This three-meaning phrase is not synonymous with the second meaning, but the third meaning is synonymous with the first meaning of the phrase zimma (si) (the next phrase is three-meaning and not synonymous with the other two meanings).

The amount of phrases that combine into a single synonymous series also varies: most synonymous series have two synonyms; the three synonymous rows are also quite numerous; there is also a series that combines four phrases. For example, the phrase tazir (i) is eaten, and so on.

In defining phraseological synonyms, different images are taken into account on their basis.

Phraseological synonyms play an important role in the field of phraseology. While it is possible to express any idea using phraseology, with the help of phraseological synonyms it is possible to apply them in different contexts according to different stylistic styles.

Thus, phraseologisms, as a unit of language that is common in language, expressing an idea broadly, figuratively, sharply, comprehensively, are composed according to the structure of all time. According to their morphological properties, the components of phraseologies belong to different word families and exist in the correct syntactic relationship with each other.

According to the structure of phraseology in linguistics, it is divided into two main groups:

1. Phraseologisms that are structurally equivalent to speech

2. Phraseologisms that are structurally equivalent to a phrase

These phraseologies differ in their lexical-grammatical features. But according to their stylistic function in speech, they perform essentially the same function. Phraseologisms that are equivalent to a sentence also have different meanings and semantic aspects and serve to express reality in existence.

In German linguistics, phraseologies can range from two components to ten components and more. Phraseologisms that are equivalent to a sentence are mostly multi-component.

By studying the semantic features of phraseological units, it was found that they have the phenomena of phraseological polysemy, phraseological synonymy, phraseological antonymy, phraseological homonymy and paronymy.

Phraseological synonyms are phraseologies that are semantically identical or very similar. They are secondary meaning properties methodological features may differ from each other syntactically according to their structure (valence, etc.).

To call two phrases synonymous, they must mean exactly the same thing. But it is wrong to understand this one meaning as equal meaning. Each synonym, in addition to the general meaning for this synonym slot, also has its own semantic edge, methodological and functional features.

Phraseological synonyms play an important role in the field of phraseology. While it is possible to express any idea using phraseology, with the help of phraseological synonyms it is possible to apply them in different contexts according to different stylistic styles.

In conclusion, it should be noted that the study of synonymous phenomena serves as a basis for a broader understanding of German phraseology and a broader understanding of their mutual semantic-stylistic relationship. Synonymous relationships are characteristic of phraseological expressions. It is precisely because of these semantic relations that we can form the spiritual paradigms of phraseological units, as well as their semantic interpretation, expressing their methodological peculiarities.

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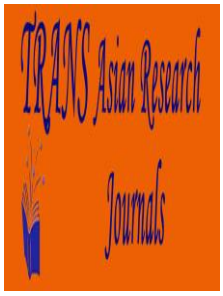

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TEACHING TECHNOLOGY OF HANDS CRAFTS SUBJECT INTO ENGLISH LANGUAGE

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ABSTRACT

This article discusses the specifics of improving the quality of teaching the subject "Folk Crafts" in English using innovative and non-traditional technologies in the specialty "Technological Education" in higher education institutions, students in both science and English. to arouse their interest in the language, to develop students' ability to think and speak independently and fluently in English, as well as to develop their creative abilities.

KEYWORDS: *specialization, science, technology, activity, purpose, problem, student, foreign language, educational technology, independent, educational institutions, motivation, cultural heritage, folk crafts, ancient monuments.*

INTRODUCTION

I like to use technology in class, first of all, because students always find it much more motivating than any other activities. Partly due to the fact that in our public schools and in higher education even computers are still considered as something in a way "luxurious", nothing to be said of the internet, Wi-Fi, laptops, tablets, etc. However, despite all the advantages and being of primary superiority the technology itself does not automatically effect the process of learning. Schools undoubtedly avoid using technology because they lack the sufficient budget spending it entails. On the opposite, the government spends the considerable amount of money on teacher training; consequently, most of us have received varied intensity education in the field of using technology in the classroom. Language teacher, teacher trainer, technology trainer and educational technology consultant, talks about the impact teaching- and learning-technology has had on students and teachers.

Does technology make language learning easier? Although advances in technology and improved accessibility have improved the level of resource available to many classrooms, it has not made the act of learning a language easier. Students are, however, given access to almost infinite learning materials, which compliments their efforts in the classroom. Indeed, technology helps students think more critically. It encourages them to question what they are learning with access to a "wider range of opinion".

As well as the learning opportunities it offers, it also affords collaborative learning to improve creativity and evaluation. Truly integrating technology into English language courses. Tech should not run alongside lesson plans but compliment or even enhance them.

Motivation in studying hand crafts and arts in English. Technology plays a massive part in day to day life for so many of us. It makes sense that it is incorporated into learning and studying. Technology fascinates us and engages us. Encouraging students to take part is arguably the most important part of any lesson plan, incorporating technology – especially creatively – could be the element that transforms a dull lesson into a captivating one.

As so much of learning comes from practice outside of the classroom, motivating students with innovative ideas is also important. If a student is interested in what is being taught, they are far more likely to seek more information on their own. Learning materials are now so much more than simply reading from a textbook, extending now to tablets and smart phones. Learners can continue to teach themselves beyond the classroom, in real life situations.

So providing the lesson hands craft and art in English in real life situations is one of the best of technologies.The students can get great deal of information about theme by hearing, sensing and watching. For instance there is various type of the art culture in Uzbekistan. As the best way to teach these folk arts and crafts to students in English, to show them the cultural heritage of our people and to provide them with complete information in English increases the importance of science. Another motivating part of the English language course for students is to take the theoretical and practical lessons of the subject to the historical monuments of our country and the shops of folk crafts and to communicate directly with foreign guests. I think this kind of teaching technology will encourage students to learn English and our cultural heritage quickly and effectively. Practice makes perfect the students. Below are some examples of creations created by folk artisans of our country.

The art culture of Uzbekistan is based on all the best achievements of the Uzbek people throughout history. National arts and crafts occupy a prominent place in the cultural heritage of Uzbekistan. In the middle Ages, Uzbek arts developed in the context of the art of tracery, which had become prevalent.

The extensive national crafts and arts include engraving on copper, wood, and plaster-based material; jeweler's arts; carpet making; ceramics; ornamental embroidery, gold embroidery; decorative currying of tanned leather; silk spinning; making of decorative braids; inlaid works on musical instruments; painting on papier-mache; creation of decorative boxes for local tobacco; baskets, cradles, chests, and many other types. Throughout the centuries, the national Uzbek crafts and arts have both risen and declined, but the handing down of artistic traditions from one generation to the next has never stopped.

Folk art. Since the ancient times, Uzbekistan has been a home to extremely talented people who carefully preserve and pass on the unique traditions of folk art from generation to generation. These traditions do not allow us to forget about our roots, our amazing culture and ethnicity.

Uzbek national arts and crafts have long enjoyed a well-deserved fame. The historical conditions, in which the culture of the Uzbek people developed, predetermined applied art a special role. For many centuries the people created its technical and artistic traditions. Applied art is genre, the main feature of which is a deep connection of artistic creativity and material needs. The organic fusion of the artistic and practically necessary creates an indissoluble unity of

ideologically- artistic and socially-practical functions. The work of applied art is distinguished by expediency and unity of forms and design. The social nature of decorative art is its collectivity; art is the heritage of many ages. It performs a series of successive layers, the most ancient of which reflect the original culture of the people deeply imprinted in its art. The works of all the genres of this art are designated by the variety of artistic traditions brought by the peoples who made up the Uzbek nation.

Kinds of national arts and crafts of Uzbekistan are the original and exclusive creativity of folk artists and artisans who pass their skills from seniors to juniors. By investing a piece of the soul in each thing, they for centuries have created unique examples of products: whether it is a house utensil or a home decoration, a unique fabric for a festive dress or special utensils.

The creations of Fergana, Samarkand, Bukhara, Khiva and other masters have long been famous far beyond their homeland. Their works continue to arouse interest among lovers of beauty from all over the world. Various schools of embroidered suzane and ceramics, Uzbek pictures on leather, skullcaps of various kinds and purposes, Uzbek national knives-pichoks, silk and wool carpets, souvenirs of papier-mache, wooden items, Uzbek jewelry, wonderful works from iron, which for many centuries are being created by the hands of local craftsmen and masters make up the unique exotic of Uzbekistan.

On the territory of Uzbekistan, the original centers and schools of folk art crafts were formed. Each terrain has its own direction. Namangan Chust is widely known for its skullcaps and knives; Rishtan is famous for cerulean ceramics; ancient Margilan attracts tourists with iridescent khan-atlas and sacred Bukhara is well-known for gold embroidery.

In the villages of Uba (Bukhara region), Nurata (Navoi region), as well as in Denau (Surkhandarya region), skilled craftsmen make clay toys. Fantastic animals, birds, horses, sheep, constitute the main stock of images of clay toys. The most popular toys are whistles. And how not to say about Uzbek national dolls! Masters literally create real images, investing in each of them the soul, strength and warmth.

Past and present of Uzbekistan art and craft. Decorative and applied arts of Uzbekistan developed from century to century, leaving in the inheritance unique products of famous and nameless masters, striking with richness of artistic imagination and consummation of forms.

Unique examples of folk architecture, fine and decorative arts of the Uzbeks go back to the era of primitive. Closely connected with material and spiritual culture, examples of the ancestors of the Uzbeks and other Central Asian peoples, ranging from primitive painting and sculpture to art monuments of the antiquity and the Middle Ages, testify to their high endowments and rich spirituality. Having common ethnogenetic roots, these peoples for centuries have been creating in the region a variety of tools, weapons of war, richly decorated clothes and jewelry, homes and household utensils that meet their aesthetic needs. The study of ethnocultural traditions of the Central Asian ethnoses showed that they have not only a common historical destiny and common ethnographic origins. The basis for creating samples of the national culture and art of each people, including Uzbeks, was shared ground. This is evidenced by the rich monuments of the ancient era, created by ancient Khorezmians, Bactrians, Sogdians, Margilans, and subsequently Turkic-speaking ethnic groups.

The Uzbek folk fine and applied arts in all its forms have long attracted the attention of boffins to the profound democracy of the ideas embedded in it, reflecting the way of life, culture and worldview of the people themselves. For many centuries, the people have created unique monuments in all genres of folklore, fine and decorative art, putting in them their understanding of beauty, their desire for beauty. Developing and improving, Uzbek folk art has brought to the present day its best traditions, which could not but have a huge influence on the development of professional art. But nowadays, we are witnessing the renewal of all kinds of folk art, which today perceive ethno-cultural traditions much more widely and many times than before. At the same time, the arts and crafts of the Uzbeks, like the art of any other people, absorbed the characteristics of the culture of different epochs and various ethnic groups that have merged into the ethnogenesis of the Uzbek people, accumulating not only certain elements of other cultures, but also those or other significant events.

Being an integral part of folk creation, decorative and applied art of Uzbekistan, which has found its vivid expression in architecture, household utensils, clothes and ornaments, helps to reveal not only the general and particular features of life and culture, but also to determine their ethnogenetic origins.

Although the types of folk art that have survived to us have retained their techniques and style, they have undergone some changes in form and content. Instead of colorful images of people, animals and other creatures, scenes of separate events with the establishment of the rule of Islam, various geometric and floral ornaments appear. On ordinary household objects and ornaments, magnificent architectural structures in accordance with Muslim dogmatics, images of living beings almost completely disappear.

Thus, in the richest ethno-cultural heritage of the Uzbek people, a special place is occupied by a multifaceted and highly decorative arts and crafts. It finds a vivid expression of artistic thought and closely interwoven with it artistic creativity, the originality of the national mentality of the Uzbeks.

Having a craft and art classes outside with art masters, and even practicing how to make or using them, and explain it in English it would be attractive and extremely unforgettable lessons for students.

Practice makes perfect the students. For those students who are less familiar with the technology used in the classroom, using it in lessons provides much-needed practice. Technology isn't set to take a back seat in learning, nor in life in general. So students value the opportunity to familiarize themselves with using different devices in different ways, not just in developing language skills.

Obviously, technology is not to be used in place of effective teaching, but interactive tasks, text-to-speech conversion and online tutorials allow students to translate on-the-go. Independent learning and studying, with access to relevant teaching material for support. Students are given the courage to try books beyond their current reading level, for example.

Providing context for the English language. For our students, practising there specialty English outside of a lesson offers **exposure to English culture**, and so context around what they are learning. Opportunities to practice English in a real-life setting are far more readily available.

Advancements in technology have propelled the education sector in the lastfew decades. As the name suggests, the high tech approach to learning utilizesdifferent technology to aid students in their classroom learning. Many educatorsuse computers and tablets in the classroom, and others may use the internet toassign homework. The internet is also beneficial in a classroom setting as itprovides unlimited resources. Teachers may also use the internet in order toconnect their students with people from around the world.

A teaching method of hand craft comprises the principles and methods used by teachers to enable student learning. These strategies are determined partly on subject matter to be taught and partly by the nature of the learner. For a particular teaching method of specialty in English has to be appropriate and efficient it has to be in relation with the characteristic of the learner and the type of learning it is supposed to bring about. Suggestions are there to design and selection of teaching methods must take into account not only the nature of the subject matter but also how students learn. In today's school the trend is that it encourages a lot of creativity. It is a known

fact that human advancement comes through reasoning. This reason and original thought enhances creativity.

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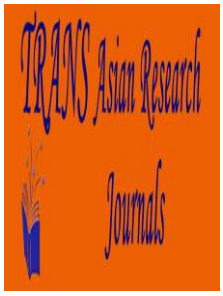

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COMPARATIVE ANALYSIS OF THE PROFITABILITY RATIOS OF SBI, ICICI AND HDFC BANKS IN THE INDIA

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ABSTRACT

The present study analyzed selected profitability ratios of SBI, ICICI and HDFC banks in India for the Period of Jan 2016 to Jan 2020. Selected profitability ratios consists Earning per Ratio (EPS), Dividend Per Ratio (DPR), Operating Profit Margin (OPM), Net Profit Margin (NPM), Return on Equity (RoE), Cost to Income (CtI), Net Interest Margin (NIM) for the study. For measuring profit of selected banks, ANOVA techniques is used.

KEYWORDS: *Earning Per Ratio(EPS), Dividend Per Ratio (DPR), Operating Profit Margin (OPM), Net Profit Margin (NPM), Return On Equity (Roe), Cost To Income (Cti), Net Interest Margin (NIM).*

INTRODUCTION

Rohit (2014) evaluated financial performance in terms of liquidity ratios, activity ratios, leverage ratios, profitability ratios and market value ratios of Axis bank, ICICI bank, Federal bank and HDFC bank for the period of 2011-2014 in India. It is observed that federal bank has the ideal current ratio of 2:1 which is better than rest of the four banks. By and large, federal bank has best price earnings ratio and asset turnover ratio among other bank. Chakraborty (2017) assessed how efficiently the carry on their business operations and showed variations among four selected banks in terms of assets, interest spread and net worth ratio. Chandan and Rajput (2002) evaluated banks profitability through multiple regression technique taking independent factors. The study also found that progress of public sector is decreased rather than foreign and private banks. Therefore, public sector banks need to focus on non performing assets and technology up gradation. Sangmi (2002) analyzed profitability of ten banks which are categorized in two group that indicate best performance banks and poor performing banks. The study revealed higher operating cost which can be improved by using technology as well as increasing productivity per employee. Kumari (2003) research study focused on progress of public and private sector bank in terms of deposit mobilization, expansion of branch, employment generation is consistently increased. It is shown that private sector banks have higher growth as compared to public sector

banks. Therefore, adopting innovation modern technological changes and proper recovery of loans is correct solution to improve for public sector banks themselves.

Qamar (2003) All types of banks found differences in terms of total assets, share capital efficiency ratio and business per employees.Arora and Verma (2005) studied that removing subjectivity in banking sector, important steps are taken like prudential norms income recognition provisioning. Researcher also suggested that impact of directed investments on profitability reserve requirements must be decreased. Reddy and Rao (2005) this study endeavored to find factors related to financial sector reforms in terms of banking industry in India. New competitive environment impacted on share of public sector banks. The researcher also suggested that public sector banks have to adopt customer oriented banking practices with new technologies. Arora and Kaur (2006) this study analyzed financial performance of banks based on Non-performing assets to Net advances, business per employee, Net profitability ratio, return on asset. The researcher suggested that banks have to take efforts to reduce the non performing assets for enhancing financial viability of public sector banks. Shukla (2009) this study analysed that banks have made many changes for their development and profitability. They have to focus on high operating cost and activities for attracting customer. Banking and financial policies and security are the important component in which Indian banks have to do improvement. Uppal (2010) the study concluded that Mobile banking services is one of the crucial part among e-channels for banking sector. This service is widely used in foreign banks and new private banks rather than old private and public banks. Mobile banking services has impacted positively on net profit and business per employees of foreign and new private banks. Prasad and Ravinder (2011) This study is analysed profitability of SBI, PNB, ICICI and HDFC bank for the period 2005 to 2010 in terms of Operating Profit Margin, Gross Profit Margin, Net Profit Margin, Earning Per Share, Return on Equity, Return on assets, Prices Earnings Ratio and Dividend payout Ratio. It is concluded that earning per share and dividend payout ratio is better for State Bank of India while Operating Profit Margin and Return on Equity is better for Panjab National Bank. The study found that HDFC bank outperformed in terms of gross profit margin, net profit margin, return on assets and price earnings ratio The objectives of this Study are: To find comparative analysis of profitability ratios of SBI, ICICI, and HDFC banks and to verify the year-wise differences in selected key ratio's of selected banks in India. Subsequently, proposed the hypothesis: There is no significant difference among selected banks in terms of profitability ratios Vs. There is significant difference among selected banks in terms of profitability ratios

METHODOLOGY:

Basic definitions and terminology

- EPS (Earning Per Ratio): This financial indicator measures the profitability of company. This is calculated by dividing the company's net income with its total number of outstanding shares.
- DPR (Dividend Per Ratio): A company issues a particular amount as dividend for every ordinary share outstanding is called Dividend Per Share.
- OPM (Operating Profit Margin): Operating margin measures how much profit a company makes on a dollar of sales after paying on variable costs of production such as wages and raw materials, but before paying interest or tax.

- NPM (Net Profit Margin): This measures net income in percentage form which helps investors assess company's management is getting enough profit from its sales including operating and overhead costs are being contained.
- RoE (Return on Equity): This measures corporation's profitability in relation to stockholders' equity.
- CI (Cost to Income): This ratio indicates profitability of banks and also depicts the efficiency at which the bank is being run. The lower ratio represents more profitability and vice versa.
- NIM (Net Interest Margin): is a measurement comparing the net interest income a financial firm generates from credit products like loans and mortgages, with the outgoing interest it pays holders of savings accounts and certificates o deposits (CDs).

Sample: The present study is descriptive and analytical in nature. The sample consists of three banks that are SBI, ICICI and HDFC.

Time Period: Jan 2016 to Jan 2020

Source of Data: The data on key variables was compiled from www.iba.org.in

Statistical Tools: The Statistical tools that have been used in this study include Mean, Standard Deviation and Two way analysis of Variance (ANOVA).

RESULT AND DISCUSSION:

In this section the analysis of the data is represented in the graphical form (Fig. 1-7) and further, inferential analysis is performed and the results were stored in the Table 1-7.

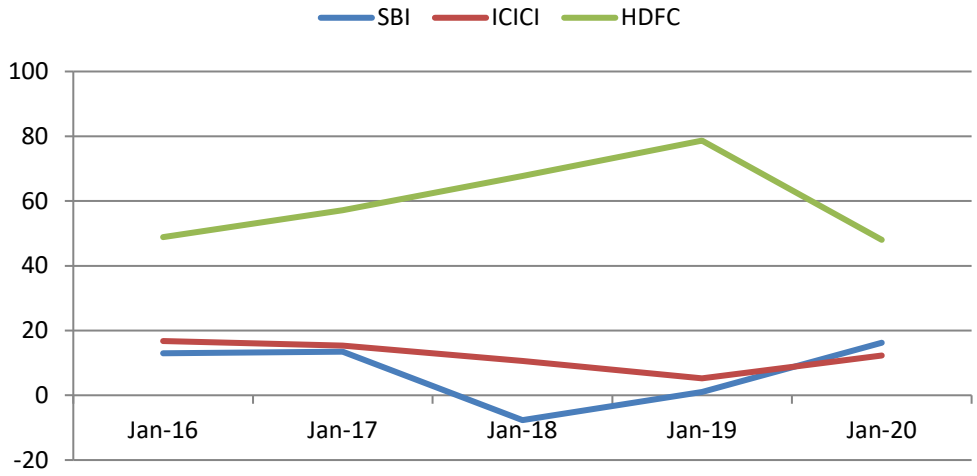

Fig. 1 Earning Per Ratio

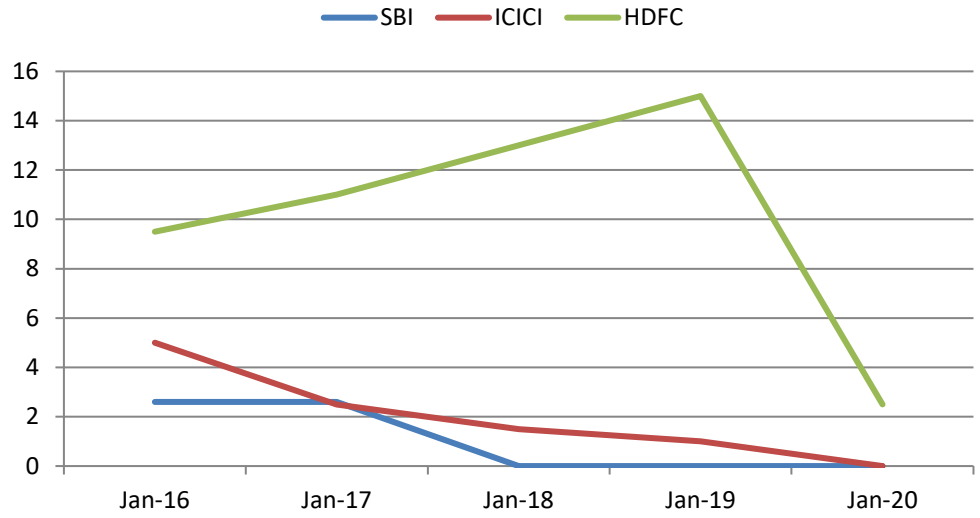

Fig. 2 Dividend Per Ratio

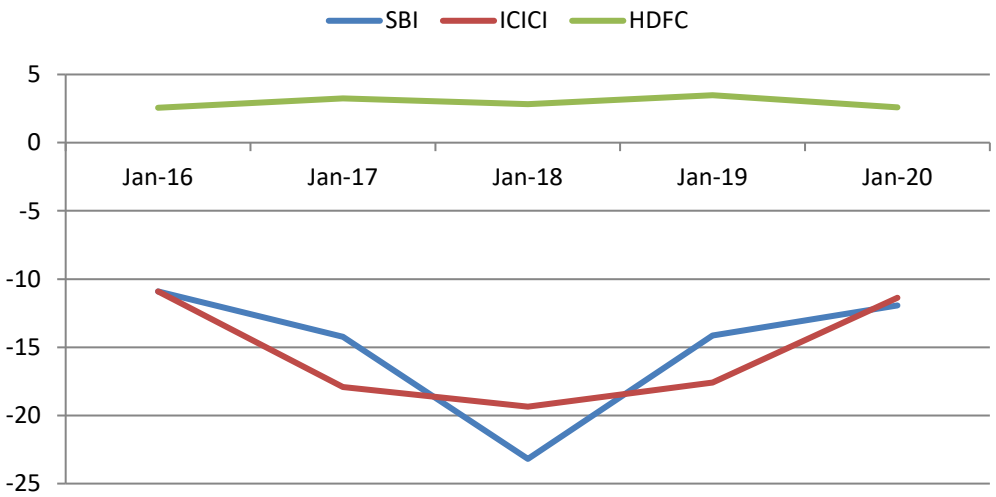

Fig. 3 Operating Profit Margin

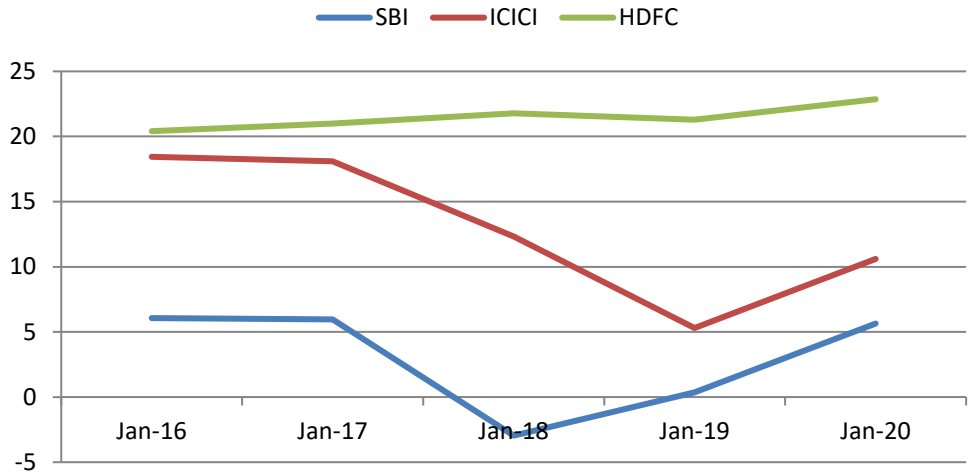

Fig. 4 Net Profit Margin

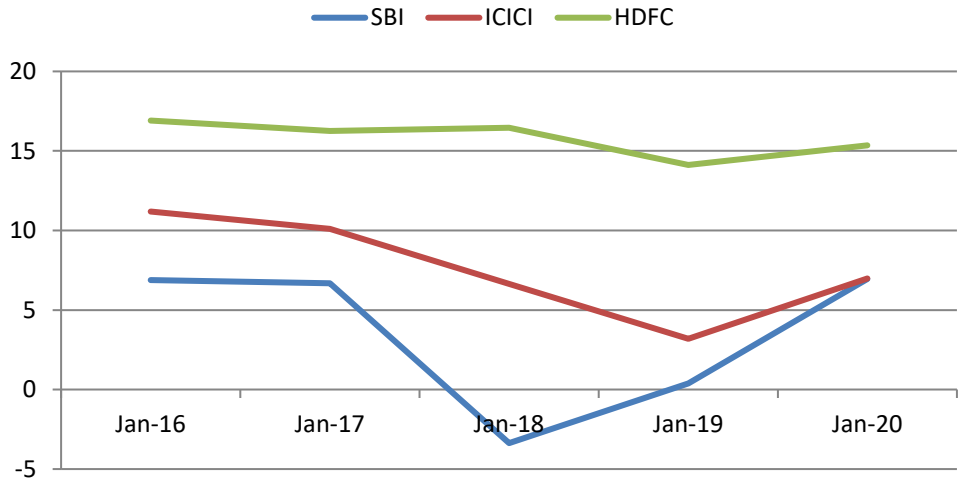

Fig. 5 Return on Equity

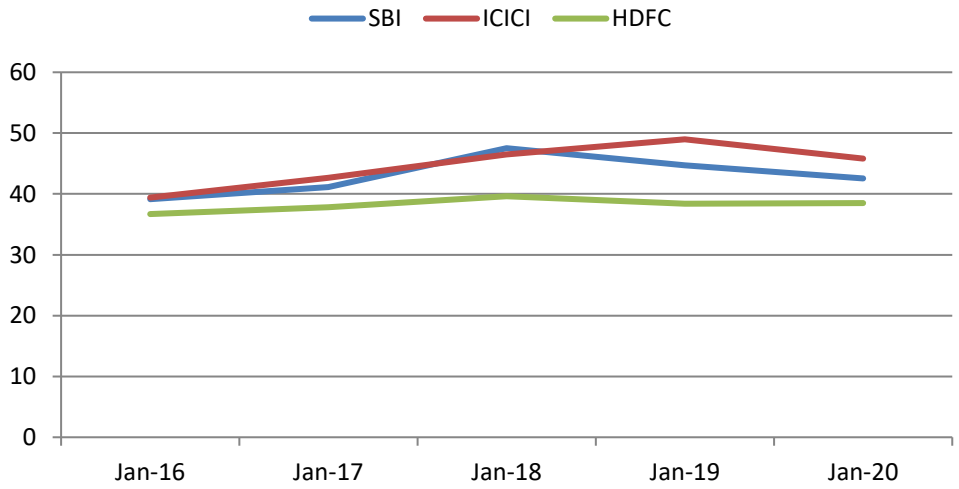

Fig. 6 Cost to Income

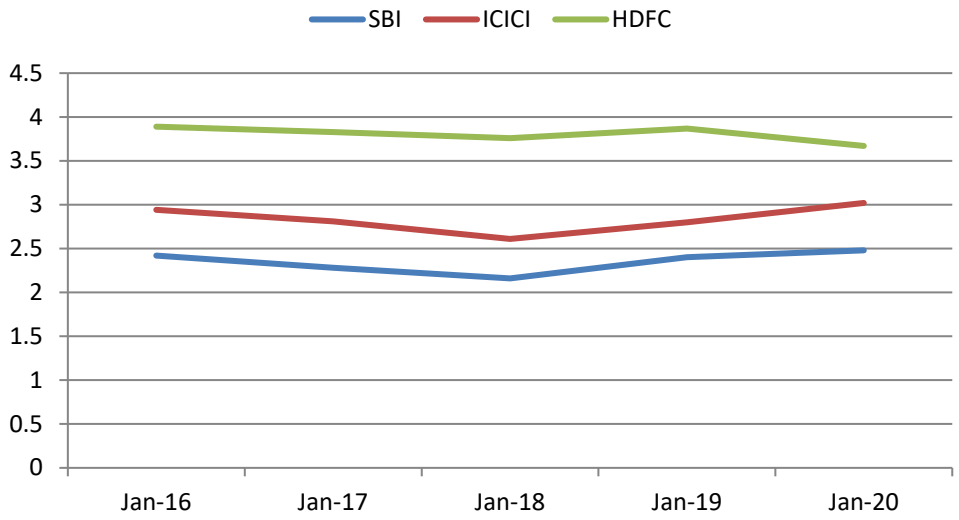

Fig. 7 Net Interest Margin

TABLE 1 ANOVA FOR EARNING PER RATIO

Source of Variance	SS	df	MS	F	P-value	F-crit
Rows	52.5702	4	13.142	0.093	0.9818	3.8378
Columns	8552.95	2	4276.47	30.359	0.0001	4.4589
Error	1126.88	8	140.86			
Total						

Table 1 explained that calculated value (0.093) is less than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is accepted, and hence, it can be concluded that there is no significant year wise difference from March 2016 to March 2019 in terms of Earning per Ratio of Selected Banks in India. This is statistically insignificant. Similarly, as calculated value (30.359) is greater than critical value (4.4589) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Earning per ratio.

TABLE 2 ANOVA FOR DIVIDEND PER RATIO

Source of Variance	SS	df	MS	F	P-value	F-crit
Rows	49.210	4	12.302	1.5211	0.2839	3.837
Columns	253.445	2	126.72	15.668	0.0017	4.458
Error	64.701	8	8.0876			

Total	367.357	14

Table 2 explained that calculated value (1.5211) is less than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is accepted, and hence, it can be concluded that there is no significant year wise difference from March 2016 to March 2019 in terms of Dividend per ratio of Selected Banks in India. This is statistically insignificant. Similarly, as calculated value (15.668) is greater than critical value (4.458) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Dividend per ratio.

TABLE 3 ANOVA FOR OPERATING PROFIT MARGIN

Source of Variance	SS	df	MS	F	P-value	F-crit
Rows	88.61049	4	22.1526	2.548	0.1211	3.8378
Columns	1092.417	2	546.208	62.843	1.282	4.458
Error	69.5329	8	8.6916			
Total						

Table 3 explained that calculated value (2.548) is less than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is accepted, and hence, it can be concluded that there is no significant year wise difference from March 2016 to March 2019 in terms of Operating Profit Margin of Selected Banks in India. Similarly, as calculated value (62.843) is greater than critical value (4.458) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Operating Profit Margin. These are statistically insignificant.

TABLE 4 ANOVA FOR NET PROFIT MARGIN

Source of Variance	SS	df	MS	F	P-value	F-crit
Rows	88.7078	4	22.17695	1.716695456	0.23876105	3.837853355
Columns	853.439	2	436.7194867	33.03192747	0.000136124	4.458970108
Error	103.3472	8	12.918395			
Total	1045.494	14				

Table 4 explained that calculated value (1.7166) is less than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is accepted, and hence, it can be concluded that there is no significant year wise difference from March 2016 to March 2019 in terms of Net Profit Margin of Selected Banks in India. This is statistically insignificant.

Similarly, as calculated value (33.0319) is greater than critical value (4.458) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Net Profit Margin

TABLE 5 ANOVA FOR RETURN ON EQUITY

Source of Variance	SS	df	MS	F	P-value	F-crit
Rows	81.8098	4	20.45245	3.060268852	0.08343185	3.83785335
Columns	392.6163733	2	196.3081867	29.37329411	0.000206369	4.45897011
Error	53.46576	8	6.68322			
Total	527.8919333	14				

Table 5 explained that calculated value (3.060) is less than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is accepted, and hence, it can be concluded that there is no significant year wise difference from March 2016 to March 2019 in terms of Return on Equity of Selected Banks in India. This is statistically significant. Similarly, as calculated value (33.0319) is greater than critical value (4.458) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Return on Equity. This is statistically significant

TABLE 6 ANOVA FOR COST TO INCOME

Source of Variance	SS	df	MS	F	P-value	F-crit
Rows	76.944533	4	19.23613333	6.323788943	0.013461664	3.837853355
Columns	112.39525	2	56.19762667	18.47470716	0.001003376	4.458970108
Error	24.334947	8	3.041868333			
Total	213.67473	14				

Table 6 explained that calculated value (6.323) is greater than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is rejected, and hence, it can be concluded that there is significant year wise difference from March 2016 to March 2019 in terms of Cost to Income of Selected Banks in India. This is statistically significant. Similarly, as calculated value (18.4747) is greater than critical value (4.458) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Cost to Income. This is statistically significant

TABLE 7 ANOVA FOR NET INTEREST MARGIN

Source of	SS	df	MS	F	P-value	F-crit

Variance						
Rows	0.107627	4	0.026906667	2.454614566	0.13019275	3.837853355
Columns	5.49184	2	2.74592	250.5020526	6.10204E-0	4.458970108
Error	0.087693	8	0.010961667			
Total	5.68716	14				

Table 7 explained that calculated value (2.454) is less than critical value (3.8378) at the 5% level of significance in the table no. 1, the null hypothesis (H01) is accepted, and hence, it can be concluded that there is no significant year wise difference from March 2016 to March 2019 in terms of Net Interest Margin of Selected Banks in India. This is statistically significant. Similarly, as calculated value (250.50) is greater than critical value (4.458) at the 5% level of significance in the same table, the null hypothesis (H01) is rejected, hence, it can be concluded that there is significant difference among SBI, ICICI and HDFC banks in terms of Net Interest Margin. This is statistically significant.

CONCLUSION

The Study is mainly focused on financial indicators which reflected profitability of selected banks from public and private sector. State Bank of India from public sector and ICICI along with HDFC banks from private sector. The study concluded HDFC is one of the best performer bank in comparison with SBI and ICICI in terms of Selected Profitability Ratio. ICICI and SBI bank have almost equal proportion of EPS, DPR, OPM, Cost to Income and Net Interest Margin. Barring Net Interest Margin and Cost to Income, All other financial ratios decreased in Jan 2018 and increased in Jan 2020. Earning Per Ratio and Dividend Per Ratio drastically reduced during Jan 2019-Jan 2020.

Limitations of the Study and Scope for Further Research:

The Study has considered one public sector and two private sector banks which could be taken more banks from public, private and foreign banks also. Duration of data and variables can be different sector-wise analysis.

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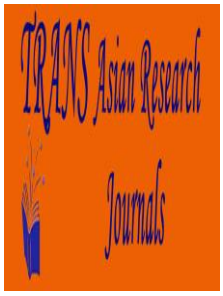

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THE ROLE OF MONOOPERATORS IN THE FORMATION OF SYNTAXIC DERIVATION OF ADDITIONAL PRESENTATIONS OF TIME IN FRENCH

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ABSTRACT

This article deals with the question of syntactic derivation of a subordinate clause of time a morphological element «when», «like». The subordinate clause of time in French among adverbial clauses is one of the largest, since more than twenty union elements are used in its syntactic formation. Here, mono-operator derivation types are characterized mainly by the morphological elements quand, comme, lorsque. The subordinate clauses of the time with simple allied elements are traditionally distinguished in French linguistics as a separate type [4,582]. At the same time, as we can see, the principles of classification of the derivational and traditional syntax coincide.

KEYWORDS: *Syntax, Conclusion, Morphology, Element, Monooperator, Transformation, Formation.*

INTRODUCTION

First of all, it should be mentioned that the French language belongs to one of the most thoroughly and comprehensively studied languages in the world. The question of the syntactic derivation of a sentence on the material of the French language is not a completely new phenomenon, since this theory has already been applied in some works. So, for example, in the "Foundations of Structural Syntax" L. Tenier describes the ways and means of forming the syntactic structure of both simple and complex sentences. In this case, junction and translation are considered relevant for expanding the structure of a simple sentence, the main markers of which are unit and translative. Whereas in the formation of a complex sentence, especially a complex one, the translation of the second stage is important, that is, secondary translation, where various types of translative and junctive can be used, such as adjunctive, disjunctive, antinomic, causal, investigative, etc. [1 , 335]

In “Структуральнойграмматике” by J. Dubois, along with the description of lexical derivation, one can notice brilliant thoughts about the formation of syntactic structures by using various transformational techniques. He thoroughly explained the syntactic functions of pronouns and pronouns / substitutes /, which are used within the syntactic structure of a complex sentence. [2, 170]

When it comes to the formation of syntactic structures, one cannot fail to mention the name of B. Potier, who has fundamental works on the theoretical issues of modern syntactic science. B. Potier created his original theory about the French utterance, about the methods and techniques of its structural formation. [3,376]

In all the above-mentioned works, along with simple sentences, we are talking to a certain extent about complex sentences, in particular about its structural formation.

The subordinate clause of time in French among adverbial clauses is one of the largest, since more than twenty union elements are used in its syntactic formation. Here, mono-operator derivation types are characterized mainly by the morphological elements quand, comme, lorsque.

The subordinate clauses of the time with simple allied elements are traditionally distinguished in French linguistics as a separate type [4,582]. At the same time, as we can see, the principles of classification of the derivational and traditional syntax coincide, i.e. in both cases, the shape of the union element is taken into account. In other words, the operators of this derivational type of time subordinate clause are indivisible into separate constituent parts: Quandellefutpartie, je courus chez le docteur (Maupassant. Contesetnouvelles, [5,295] 'When she left, I ran to the doctor.

First, let us pay attention to the transformation process, the final result of which is the syntactic derivation of the given subordinate clause:

Elle futpartie; (après cela) je courus chez le docteur 'She left; then I ran to the doctor.

The transformation process first of all requires a transpositional change, with the help of which one of a given independent sentence is functionally transposed into a non-independent one. In this case, the choice is made according to the time plans of independent proposals. Therefore, in this case, the first of them is transposed into the non-self-dependent under the pressure of the quand element introduced from the outside, which simultaneously performs the function of a subordinate union. After that, the transformation process already begins, within the framework of which a complex sentence is formed.

As already mentioned, at the level of a complex sentence, transformational and derivational processes are equivalent. In this regard, the transposer, which transposes an independent sentence into a non-independent one, also functions as a syntactic derivation operator. As for the time plan of a given subordinate clause of time, in this case it expresses a difference in timing, because the action of the subordinate clause is performed earlier than the actions of the main clause. In addition, in mono-operator subordinate clauses with the quand operator, the simultaneous execution of the actions of their constituent parts is often observed:

Op te les rendraquandtusortirasClavel. La saison des loups, [6,276] they will be returned to you when you go out.

From the above sentence it is clear that the syntactic position of the constituent parts of the mono-operator subordinate clause of the time in quand is not immanent. Therefore, the operator

can be positioned both at the beginning of a sentence and between two operands. Despite this, he is the sole master of the entire derivational process, because his removal from the sentence will completely destroy the content and syntactic structure of the derivative. However, this does not mean that the quand operator is irreplaceable. It can be replaced by appropriate operators if they are both semantically and syntactically synonymous with it.

At the same time, the syntactic positions of the directly constituent parts of a complex sentence remain unchanged. Compare: Des qu'ellefutpartie ... ↔ Quandellefutpartie ... On te les rendracomme ... ↔On te les rendraquand ….

As the above examples show, the paradigm of derivative-forming elements in this case can include both simple and complex, i.e. duplicate operators, the choice of which is made by the informant in accordance with the prevailing situation.

In the terminology of L. Tenier in French, the precedence and adherence of one action to another is expressed in a double translational. In such cases, the broadcast of the first stage is superimposed on the broadcast of the second stage. The marker of the second stage translation is the preposition / eg après 'after', avant 'before', / depending on the general meaning of the sentence [7,572]

A similar opinion, i.e. the opinion on the use of après que for expressing the following of an action, avant que for expressing precedence, is also observed by the French linguists R.L. Wagner and J. Pinschon [8,582]. However, as the analysis of the factual material shows, similar functions can be performed with the help of a mono-operator. Wed: On finissait le café, quand le brigadier de gendarmerie parut sur le seuil Maupassant. Contesetnouvelles, [9,291]. They were finishing their coffee when the gendarmerie brigadier appeared at the doorstep '↔ Après que le brigadier de gendarmerie parut sur le seuil, ↔ Avant qu'onfinissait le café, ….

Of course, the use of each individual operator has its own purposes and purposes. But, despite this, the possibility of creating invariant forms of derivatives with the help of other operators in accordance with the internal laws of natural language is not excluded.

In the process of syntactic derivation of mono-operator subordinate clauses in quand, a syntactic relation of almost independent sentences is established. Therefore, the entire burden of derivational operations is experienced here by the derivative-forming element. In other words, the derivation operator is the only support in the syntactic design of a complex complex of this type.

In advance, i.e. before the creation of a derivational process, within the framework of independent sentences, such functions of any words are inconceivable. They will only be possible during the derivation process. As GS Shchur notes: “In language, unlike chess, we, as a rule, do not know in advance either the possible“ moves ”of individual elements, much less the possible results of their interaction and further combinatorics [10,49].

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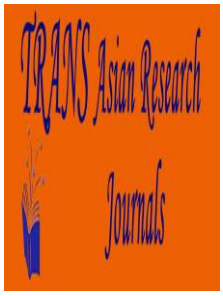

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TERMINATION OF THE EMPLOYMENT CONTRACT DUE TO CHANGES IN THE NUMBER OF EMPLOYEES (STAFF TABLE) AND THE NATURE OF THE WORK

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ABSTRACT

In this article, based on the analysis of national legislation and scientific literature,the author discusses the termination of the employment contract on the initiative of the employer due to changes in the number of employees, in the staff table and in the nature of the work.In particular, the author highlightsthe differences between the concepts of "number of employees" and "staff table", the essence of the concept of "change in the nature of work", issues that should be paid attention to terminate an employment contract due to staff reductions. In addition, the author suggests proposals to improve the legislation in this area.

KEYWORDS: *"Change In The Number Of Employees", "Change In The Staff Table", "Change In The Nature Of Work", "Changes In Technology, Organization Of Production And Labor", "Reduction In The Volume Of Work".*

INTRODUCTION

The termination of labor relations due to the changes in technology, production and organization of labor, the reduction of workload are characterized by their economic and administrative-legal nature as one of the specific problematic grounds for termination of the employment contract.

This basis is specified in Paragraph 1 of the second part of Article 100 of the Labor Code of the Republic of Uzbekistan as "changes in technology, organization of production and labor, reduction of the volume of work or termination of the enterprise, which led to a change in the number of employees (staff) or the nature of work". "

Analyzing this paragraph in parts, we can see that there are 4 grounds for termination of an employment contract at the initiative of the employer:

1. Change in the number of employees;

2. Change in the staff number;

3. Changes in the nature of work;

4. Liquidation of the enterprise.

If we analyze the above norm in the Uzbek and Russian texts of the Labor Code of the Republic of Uzbekistan, we can see a discrepancy between them. The Russian text states that "changes in technology, organization of production and labor, reduction of production volumes, reduced changes in the number of employees (staff) or change in the nature of work, or liquidation of the enterprise."

Accordingly, in order to eliminate the incompatibility between these two languages it is proposed to edit the text in Uzbek as “change in the number of employees (staff) or the nature of work as a result of changes in technology, production and labor organization, reduced workload”. This ensures that this norm is stated in a concise, clear, simple and fluent language, excluding different interpretations.

Another common misunderstanding that arises in practice is that no normative legal document clarifies the concept of "number of employees (staff)". There is no clear distinction between these two concepts (“number of employees” and “staff”). This creates certain difficulties in the proper execution of documents in this regard, when it is necessary to terminate the employment contract on one of these grounds.

In fact, Article 107 of the Labor Code of the Republic of Uzbekistan stipulates that the employer's order must contain the grounds for termination of the employment contract in full accordance with the definition of the relevant articles of the Code or other normative acts providing additional grounds for termination of the employment contract.

Correspondingly, there is a necessity to clearly state in the order that the employment contract was terminated on the basis of “change in the number of employees” or “change in the number staff”. It should be highlighted that it is difficult to find an answer to this question, both in theory and in practice. At the same time, as a rule, these concepts are used inseparably in court decisions, scientific and practical comments.

To understand the difference between staff reductions and employees number reductions, we focus on the etymology of the words “number” and “staff”. The term "number" represents a certain quantity (a tool used to calculate the number, quantity, number of things) and "staff" is a set of information about positions, their number, salary and other information.

This means, a reduction in the number of employees means a reduction in one or more units provided for a particular staff (s), and the staff is retained (with at least 1 staff unit). When the employees staff is reduced, any position in the staffing table (for example, deputy chief accountant), or a particular component network is completely excluded from the list of staff with all staff.

Accordingly, these concepts were analyzed and the author's definition was developed: "number of employees" is the number (quantity) of positions in a particular state unit, provided by the staffing table of the enterprise, and "staff" is a set of information about a particular position, its number, salary and other information provided for in the staffing table of the enterprise.

Another peculiarity of termination of an employment contract on this basis is that according to which the termination of the employment relationship can be applied to a wide group of employees (and this does not depend on their will). Here, non-performance or improper

performance of work duties is not a major aspect; an employment relationship can also be terminated with employees who have been performing their job duties conscientiously and with quality for many years.

With regard to the "change in the nature of work", according to the scientist M.Yu.Gasanov, "... the former Labor Code used the term "reduction in the number of employees or staff" (Paragraph 1 of Article 41). It did not fully reflect the essence of the event under consideration. It should be noted that this rules was used both in the past and now, not only in cases where the number of employees has been reduced or the number of positions provided for in the staff list has been reduced, but also termination of the employment contract on this basis is also allowed when the enterprise needs employees of other professions (for example, change of its type of work or automation of production), or (due to the fact that previous employees did not have the knowledge and skills necessary to perform this work) when it is impossible to maintain an employment relationship with them.

In the above circumstances and similar cases, the number of employees of the enterprise may decrease or increase. For this reason, the Labor Code uses the term "change in the number of employees (staff) or the nature of work[1]".

According to Russian scientist N.V.Demidov, the legislation of Uzbekistan does not clarify the meaning of the concept of "change in the nature of work" and does not specify the types of such changes and the exact criteria for justifying dismissal on that basis.

It is up to the court to answer any questions that may arise in this regard (depending on the circumstances of each individual case). "This approach is explained by the fact that the dismissal has been adopted from the legal regulation system adopted in the United States. This tendency in the legislation of Uzbekistan is evident in some other cases as well"[2].

That is, if the nature of the work assigned to this position changes (even if a certain position in the enterprise is not reduced by a staff unit), due to the fact that previous employees did not have the knowledge and skills necessary to perform this work, the employer has the right to terminate the employment contract when it is impossible to maintain an employment relationship with them.

It should be emphasized that the clarification of the concept of "change in the nature of work" in labor law plays an important role in law enforcement practice, because, in practice, it is hard to find cases of termination of an employment contract on the basis of a "change in the nature of work." The lack of clarity in this concept may lead to the termination of the employment contract by the introduction of another staff unit for the same position (and due to the reduction of the employee staff unit) by reducing a certain staff unit.

Accordingly, it is expedient to clarify this concept in the Labor Code of the Republic of Uzbekistan in the sense that "a change in the nature of work means a change in the terms of employment conditioned by the employment contract for a position in a particular state unit".

In general, the current legislation is additional guarantee related to the termination of contract based on paragraph 1 second part of Article 100 of the Labor Code of the Republic of Uzbekistan.

In particular, the difference between the labor legislation of the Republic of Uzbekistan and the legislation of a number of other foreign countries (Article 81, Part 1, Paragraph 2 of the Labor

Code of the Russian Federation, Article 40 of the Labor Code of Ukraine) is that to terminate an employment contract on this basis in our national legislation is legal only if the number of employees (staff) or the nature of the work changes as a result of changes in technology, production and labor organization or reduction of workload.

Because changes in technology, production and labor organization, or a reduction in the volume of work do not always lead to a change in the number of employees (staff) or the nature of the work. Employment contract may not be terminated in accordance with paragraph 1 of the second part of Article 100 of the Labor Code of the Republic of Uzbekistan, for example, when there are changes in technology, production and organization of labor, or when the volume of work is reduced, retaining the previous number of employees (staff) or the previous feature of the job (only if certain working conditions change).

For instance, the Labor Code of Georgia, which has similar approach (Article 47) states that "economic circumstances, technological or organizational changes that determine the need to reduce the workforce" are grounds for termination of an employment contract[3].

Termination of the employment contract on this basis is considered legal only if main reason for the change in the number of employees (staff) or the nature of the work is changes in technology, production and organization of labor, or a reduction in the volume of work.

Definitely, each of the examples above must be supported by evidence. For example, introduction of production mode, which involves doing a certain amount of work in a manufacturing plant with fewer employees than the number of employees available, may be evidence of changes in the organization of production and labor. In this example, the approval of a new staffing schedule as a result of a change in this production schedule is evidence of a change in staffing.

The employer must have the relevant documents proving that the scope of work actually performed in the enterprise is less than before, in cases where the reduction in workload is the main reason for the change in the number of employees (staff) or the nature of the work. For example, this may include in service organizations with a lack of contracts with customers over a period of time, such as a much lower number of orders.

It should be emphasized that if there are other vacancies for this category of employees in a particular organization, pursuant to paragraph 1 of the the second part of Article 100 of the Labor Code of the Republic of Uzbekistan, termination of an employment contract may not be effected at the expense of existing employees. In such cases, it is legal to make staff reductions by removing a vacancy from the staffing table.

For instance, if there are 3 specialist positions in the organization and 2 of them are actually working, first of all, termination of the employment contract with the employee without removing the vacancy from the staffing table is a violation of the employee's labor rights. If dismissed in such case, s/he must be restored to his former job.

It is also necessary to pay special attention to the scope of employees whose activities are related to this change or reduction in the termination of the employment contract due to changes in technology, production and organization of labor or reduction of workload.

If the changes in technology, production and organization of labor, or a reduction in the volume of work are to be applied to a specific group of employees, it would be legal to terminate the

employment contract with these particular employees. For example, in an organization, it is unreasonable to dismiss support staff in the process of terminating an employment relationship in connection with a reduction in the workload of management staff.

It should be highlighted that even when a particular organization is reorganized, there may arise a need to terminate the employment contract with a number of employees. At such times, upon completion of the reorganization, the employment contract with them shall be carried out in compliance with all rules and guarantees, regardless of the grounds for termination. Noted that,in reorganization (for example, when two organizations are merged into a single organization) an increase in the number of employees relative to the workload may occur, and it is illegal to terminate an employment contract with these employees (grounds: reduction in the number of employees (staff) or the volume of work that led to a change in the nature of work) before the reorganization process is completed.

As mentioned above, this basis for dismissal is also enshrined in the labor legislation of foreign countries. In most national legal systems, the reduction of the number of employees or the number of employees is the subject of regulation of labor legislation and is regulated by specially developed norms.

According to Article 40 of the Labor Code of Ukraine, and the Labor Code of USSR (1971), the grounds for dismissal in connection with the termination of the enterprise and the reduction of the number of employees or staff were combined[4].

The Law of the Republic of Estonia (December 17, 2008) "On the employment contract" (Article 89), which deals with the termination of employment by the employer for economic reasons, according to it the employer may terminate the employment contract in an emergency if it is not possible to continue the employment relationship on the agreed terms due to the reduction of the workload, reorganization of the work or other termination (reduction) of the work[5].

In accordance with the Labor Law of the Republic of Latvia (June 20, 2001) (Article 101), “reduction of the number of employees” is listed as one of the grounds for termination of an employment contract at the initiative of the employer. And according to Article 104 of the same Law, "reduction of the number of employees is the termination of the employment contract for reasons not related to the behavior or qualifications of the employee, but sufficiently justified by the need to carry out urgent economic, organizational, technological or similar measures”[6].

In the countries where the Anglo-Saxon legal family operates, the regulation of dismissals in connection with the reduction of the number of employees or staff is of a dual nature. On the one hand, there is the practice of applying the general principles of contract law in terminating an employment contract on this basis (i.e., direct use of civil law structures), on the other hand, the social significance of the consequences of mass dismissal has led to some standards in labor law.

The first concept is practiced in the United States. According to the historical traditions, the economic management of the employer is recognized. And this is applies to dismissal due to a reduction in the number of states or employees. Only dismissal for violation of rights and guarantees established by law, and discriminatory reasons is prohibited. At the same time, the meaning of the concept of "discrimination" is not absolutely defined, and will be assessed by the court on a case-by-case basis.

Pursuant to the 1996 Labor Rights Act (ERA 1996) in the United Kingdom, "reduction" is one of the legal grounds for dismissal. According to the law (Article 139), the literal translation of

dismissal in connection with the reduction of the number of staff or employees is an integral part of the concept of "redundancy" (which means, "no need/redundancy"). This concept also includes dismissal in the event of termination of the organization (ERA 1996, p. 139 (1) (a)) and transfer of employees to another job (ERA 1996, p. 139 (1) (c)). Selection criteria for dismissed employees should be applied equally and without exception (ERA 1996, p. 105 (1) (b)). Article 100 of the ERA 1996 defines an employee's knowledge and skills as selection criteria, but the list of indicators to be compared is not detailed or limited.

Nonetheless, this law limits the number of employees who can receive compensation for dismissal. This list includes unskilled workers (article135), those with less than two years of work experience (article 155), workers who refused alternative vacancies (article141 (2) s), foreign nationals (article 159), and the Overseas government employment) (article 160) employees, as well as individuals who missed the six-month claim period (article 164).

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